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December 1988

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We put the Maci

It began with a phone call in 1981. And what resulted is the stuff history is made of: together Microsoft and Apple® were going to offer corporate America a new way to compute.

With a disarming little computer called a Macintosh.



In 1984, Apple told the world why 1984 was not going to be like 1984—and Microsoft was the only independent developer to ship software the same day the Macintosh shipped.

At Microsoft we knew that, with the right software and the right engineering, this new machine could literally change the way people work. So for the next three years we were unflinchingly committed to making the Macintosh the most functional, intuitive, powerful business computer ever used.

Finally, in 1984, the invasion began. And since that time we have created state-of-the-art applications for the Macintosh that have spawned a new breed of business person:

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Over one million people use Microsoft so and we rely on their input to make our products the most useful in busine

Words alone, however, fail to define the scope of Microsoft's involvement with the Macintosh.

Enter Microsoft Excel. When it was introduced, Microsoft Excel was the most compelling reason to buy a Macintosh. The business user wanted power, and Microsoft Excel had loads of it. Today, with the introduction of version 1.5, eight out of ten of those Macintosh users who use a spreadsheet use Microsoft Excel.

It was the graphic capabilities of the Macintosh that allowed Microsoft

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ntosh in business.

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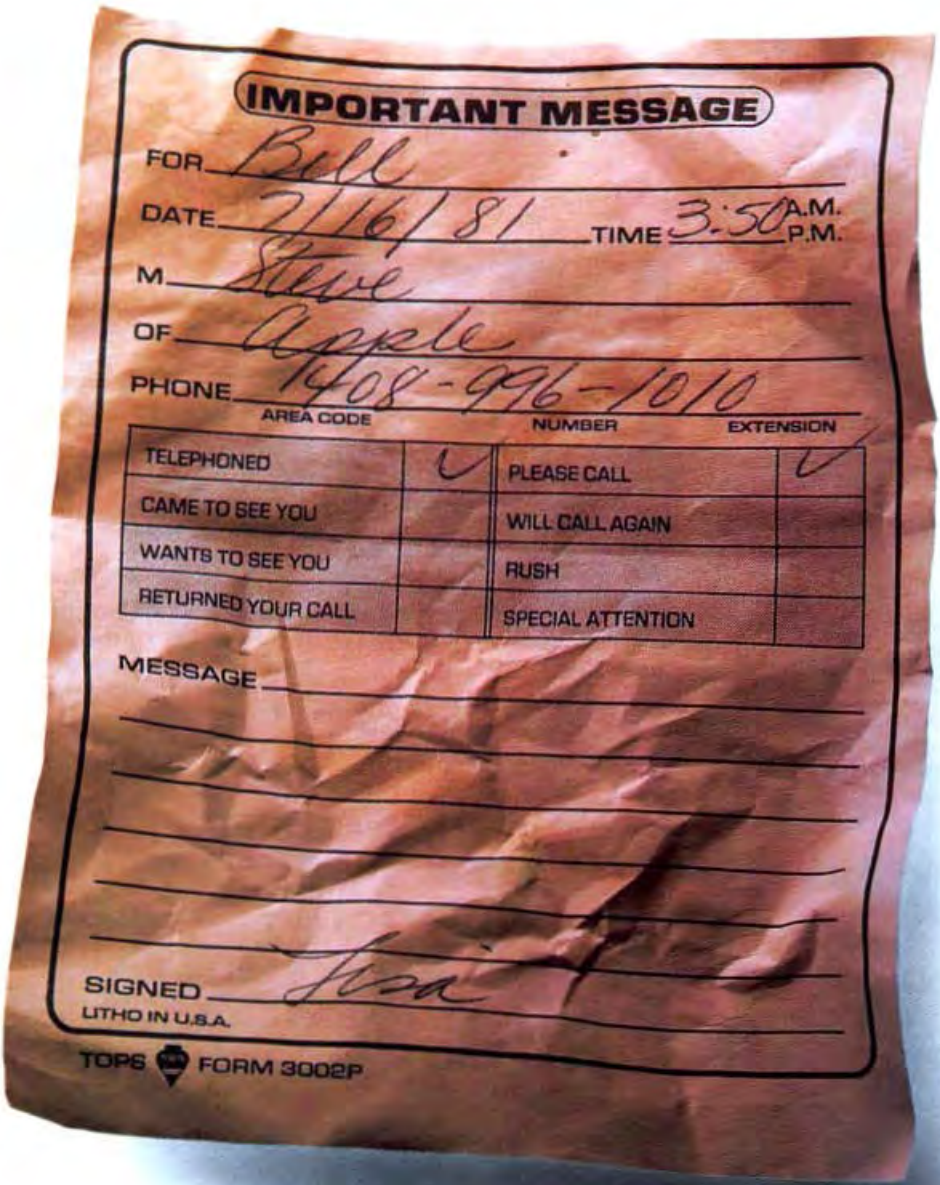
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TOPS FORM 3002P

the information machine

Information, Please
by Jon Zilber

Numbers, numbers everywhere, and not much time to think. With a hypothesis here and a deduction there, your Mac can transform them into useful information. Programs like Crystal Ball, DATA, Extend, and Milo can help you take arms against a sea of numbers and by supposing tend them. **94**

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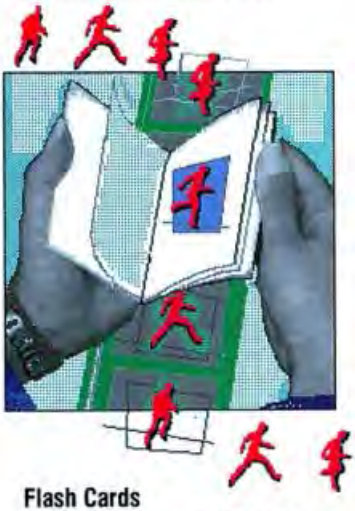
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We love to get tips and hints (on disk, please) from our readers. Any tips should be sent to The Tip Sheet, c/o *MacUser* Magazine, 950 Tower Lane, 18th floor, Foster City, CA 94404. We can't print every tip, but we try our best to pick the most interesting and representative ones for publication. We're also interested in hearing from any programmers who are interested in contributing to our utilities disk series or labs benchmark disk series. If interested, contact Chip Carman, Technical Director, at the same address.

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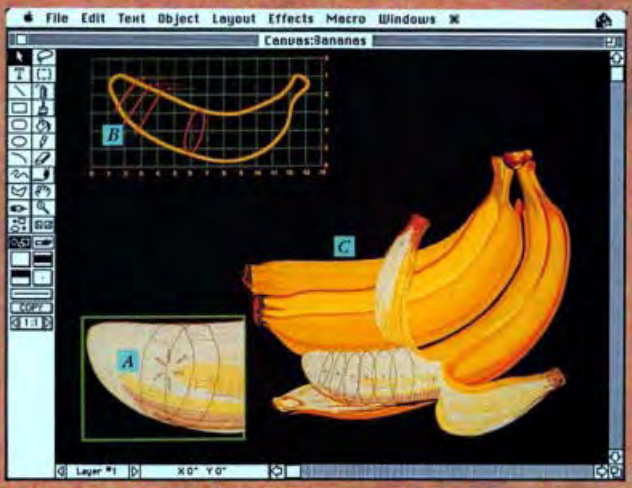
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A To an architect, fine hairlines like ours are pure poetry.

B Auto-tracing built this banana from a scanned-in produce ad. In split seconds.

C Multi-point bezier curves make drawing a bunch easier. Colors are added in layers.

D Auto-resizing helped this VP. of Sales display the fruits of his labor, graphically.



E Smooth, continuous color blending inspired this art director to new heights.

F What are mere words compared to WYSIWYG text with special effects?

G After he slipped away, we added rich Postscript* gray scales to Koko's leftovers.







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The Information Machine

Look out for information overload. If it hasn't hit you already like a swarm of short circuits, it's headed your way. From communications to publishing to video, we're like electricians in a Kafka novel: In a hotel with a thousand rooms, each with its own TV, each broadcasting a different show, there's only one control box — and we're rushing from room to room to find it.

In modern times, the growth of human knowledge has escalated exponentially. For most of human history, knowledge was verbal, passed from generation to generation in myths and stories told by wandering bards and by the elders of the tribe. The need for permanence resulted in hieroglyphs chiseled into stone, giving way to ideograms and scribes illuminating parchments one by one. With the printing press came the first information explosion. Books and other written materials could be widely distributed, fundamentally changing human society. No longer could the high priests of knowledge — monks, alchemists, and librarians — guard the portals. Decentralized knowledge could be shared, and the result was that the feudal, monarchic order of societies broke down in favor of democracies and republics.

We're smack in the middle of another turning point, this time driven by the computer. The advent of electronic, digital data banks and the widespread adoption of wide-ranging media have fundamentally altered the information landscape. It's no longer just the dog-eared paperback in the straphanger's hands that speaks of information egalitarianism. There's also the corner video-rental shop and the FM radio station blaring from the sports car parked next to you at the traffic light. For us, the hard part is no longer getting our hands on the information — the trouble is using all this information



to help us make wiser decisions. Information is power, but you can't take advantage of it until you know how to harness it. Which leads us to the Mac, the best tool available for gathering and shaping information, a tool so good in fact that we dub it here the *Information Machine* par excellence.

Saying that the Macintosh is the best computer for molding information may seem a bit brash. The Mac doesn't have the fastest processor or the largest storage capacity. But any benchmarking here must also measure the types of information that can be processed and the versatility and sophistication of the machine's processing tools. Here the Mac shines as a pen, a brush, a keyboard, a drafting table. Huge storage space and speed may be the forte of the minicomputer and the mainframe, which mainly process alphanumeric data. But these computers are not well-suited to juggling multifaceted media. Isn't that what humans do best?

MS-DOS has its roots firmly implanted in an alphanumeric family tree. MS-DOS closely copied the older CP/M command strategy for manipulating data, which was modeled after an older minicomputer operating system that in turn resembled an even earlier mainframe operating system. But the MS-DOS command strategy (typified by the A) prompt) represents archaic principles of computer operation. People don't just think in commands; they *associate*. And while it may be true that you can run an alphanumeric relational database at a faster speed in the world of MS-DOS (see this month's lab report), the Macintosh lets you integrate more types of information and serve it up in a more manageable form. The Mac is a multimedia *maestro*. Words, numbers, symbols, graphics, still and moving pictures, sounds, and signals can all be orchestrated — at fingertip's length.

With such complex talents, the Mac has assisted in the decentralization of data processing that began with the PC. But until recently, the Macintosh had a few missing pieces that made it hard to recommend as an all-purpose information machine. For example, it couldn't easily tap into corporate mainframes, where much information *is* centralized. Additionally, there was no color, it didn't have good OCR technology, and *hypertext* — the linguistic equivalent of how people think — was unavailable.

All this has changed. Emulators, controller cards, and gateways give you paths to other types of computers. Double Helix allows you to build applications that can connect to a VAX, and products such as FoxBASE, McMax, and dBASE Mac let you work with data in an MS-DOS dBASE database. The exciting new Oracle-HyperCard connection allows you to take advantage of data in practically any SQL or DB2 database running on a microcomputer, minicom-

Number One in Macintosh CAD



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puter, or mainframe and create a powerful network-distributed database application.

Scanners let you bring both black-and-white and color images into your Mac, and OCR software is both teachable and well-taught. Sophisticated image-processing tools like ImageStudio, Digital Darkroom, and PhotoMac enable you to process those images in ways you never dreamed of. And the image-creation business has never been more robust. The increasing numbers of paint, draw, CAD, and 3-D programs for the Macintosh continue to keep us ahead of the rest of the computer business.

The list goes on. Image-retrieval systems like CD-ROM and videodisc combined with image-presentation tools like the many outstanding desktop-publishing, presentation, and animation products have made the Mac a wizard on the page and a director in the boardroom. Artists have at their disposal such tools as sound digitizers and MIDI music software. Videophiles can utilize video digitizers and frame grabbers, not to mention HyperCard-based laserdisc systems.

More traditional tools, such as the FileMaker flat-file data manager, are standbys in information management. Or, if you prefer, plenty of relational databases like FoxBASE, 4th Dimension, and the others covered in this month's MacUser Labs report are available. For numeric information, the Mac has great spreadsheets, astonishing statistical analysis (not just capture) packages, and advanced mathematical-processing programs like Mathematica and Milo. There are niche products such as map-making programs for working with geographic and zip-coded information. And there's more: project-management, stress-analysis, medical-expert systems.

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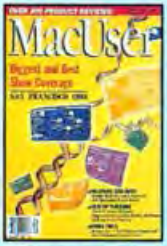
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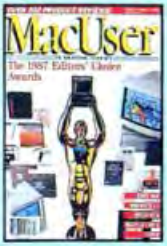
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March '88—When Speed Counts; Focal Point and Business Class the new commercial stacks; Microsoft Word 3.01; QUED/M and Stepping Out programs; Apple's new System software: worth the price?; VideoWorks II; See Mac Read; Trust and Betrayal: how's your aura?; and more.



February '88—The 1987 Editor's Choice Awards; dBase Mac; Mindwrite 1.1 adds more power; Ready, Set, Go! 4 will take over Pagemaker?; Reflex Plus; Scoop; ImageMaker's 35mm slide capabilities; picking a compiler; two modem-sharing solutions; Oriental graphics with MacCalligraphy; and more.



January '88—QuicKeys: using the mouse as an accessory. Plus: Why Canvas wins out over LaserPaint; MacSmarts and Instant Expert compared; Hypertext in 512K; Hypercard programming tutorial; Desktop Express e-mail; Macintosh Programmer's Workshop examined, Part I; making Postscript special effects work; and more.



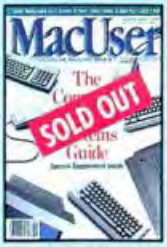
December '87—HyperCard: royal flush or bluff?; Trapeze 2.0; hard disk preventive care and cures; the arrival of Red Ryder 10.0; The Comic Strip Factory; feats of magic with Time Wand; Master Tracks Pro: the best Mac MIDI sequencer?; a guide to Castle Shadowgate game; report from the Seybold Desktop Publishing Conference; and more.



November '87—4th Dimension: the ultimate data base?; unlimited font and DA access with Suitcase; a roundup of new and updated accounting programs; supercharging your SE; personal organization made simple, with C.A.T.; how to leave notes for yourself, with Comment; professional CAD/CAM on the Mac; and more.



October '87—Laser Wars! Postscript printer free-for-all; Course Builder educational program developer; utilizing the full power of Excel; PageMaker 2.0; still the standard?; JustText Postscript desktop publishing program; Fontographer; GraphicWorks 1.1; Jam Factory and M music programs; and more.



September '87—Special Supplement: "The Complete MacUser Systems Guide" includes guide to configurations, systems guide directory, and more. Plus: Xpress; Doug Clapp's Word Tools; Douglas Adams on Word 3.0; GraphicWorks 1.1 and SuperPaint compared; recycling ImageWriter ribbons; and more.



March '87—Special section on new word processors reviews Laser Author, MindWrite, Word Handler, Word 3.0 and WriteNow; MacinTax tax preparation software; 5 time-saving printer buffers compared; 5 AI languages reviewed; Mac Pro Football; FREE program in Softstrip format; and more.



December '86—Why Apple's new IIGS is going to help the Macintosh; Accounting Plus; PhoneNET saves money without sacrificing quality; inBOX E-mail system; Studio Session adds more voices to the Mac; Doug Clapp on the secrets of Pascal; StatView 512+; Compiled ZBASIC; FREE programs in Softstrip format; and more.

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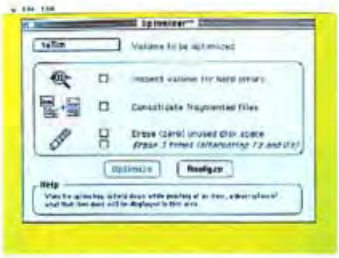


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Letters

Kevin Podsiadlik of Farmington, MI, wants to know if the ad for MacShades opposite the first page of the inaugural installment of our Scrapbook department is what the editors of Games *magazine call a "fake ad." Kevin adds that "Even though I find this section a pleasant diversion from the relative dryness of the computer field, it also confuses me. Are any of the products reviewed for real? Is anything in Scrapbook for real?"* Faux *sure, Kevin,* faux *sure. Aside from the occasional ad for products that are, well, ahead of their time, Scrapbook is as real as it gets.*

If you have some advice or dissent, send it our way: Letters to the Editor, MacUser, *950 Tower Lane, 18th floor, Foster City, CA 94404. All letters become the property of* MacUser, *and we reserve the right to edit any letters we print.*

THE MISSING LINKS

What gives? On page 122 of your September '88 issue, the "Home-Wiring" sidebar says to see the pinout diagrams below that show how to make cables to connect Macs to the world of MS-DOS. So I looked out below, but — to paraphrase Gertrude Stein — there wasn't any below below. Was my copy missing a fold-down page, or what?

BERNARD A. SCHMETZMANN
ST. VAN BOCHOVE, MI

To paraphrase Gertrude Stein, "We goofed!" But we're making it up to you with an upcoming feature that tells you how to make just about any cable you might need, including the missing Mac-to-DOS cables. — JZ

NEXT IN LINE

NeXT has a new idea in bundling software with computers? In your response to an anonymous letter in the



October '88 issue, you seem to have forgotten your history. In 1981, the Osborne-1 computer was shipped bundled with Microsoft Basic, C-Basic, WordStar, SuperCalc, and CP/M — $1,800 worth of bundled software to run on your $1,800 computer. The Macintosh came bundled with MacPaint and MacWrite when it was first introduced. Even now, HyperCard is bundled with Macs.

If you don't want to pay for your software, write what you need yourself. If enough people take this approach and share their work, then a large library of public-domain (or freely redistributable/usable) software becomes available. This worked fine in the computer industry in the time of SHARE on the IBM 360 mainframes, until the *shareware* concept came out on the IBM PC and dealt a heavy blow to the amount of new software that was public domain. Now software that would have been public domain comes with begging notices ("Please pay your fair share so my cat can eat!") and idle threats ("You may not use this software unless you have paid your shareware fee!").

Back before shareware, not only did the programs come free but also the source code. A trusted person in your user group could examine any new software's source code for bugs and viruses and, when satisfied that it wasn't going to eat a hard disk, could compile it and hand you the binaries. In today's environment, when you get a new program from a bulletin board or user group, you are taking a risk that your hard disk will be formatted by some malicious teenaged cracker from New Jersey.

Bundling software with a new machine is a very good idea — what use is it if you have to go out and spend $1,000 on software after you take your machine home and find out that all it will do is smile at you and show you a desktop? (Clean Up Window is fun only for the first 15 minutes.)

Those who do not remember the past are doomed to repeat it.

ANDREW SCOTT BEALS
SAN FRANCISCO, CA

A MOMENTARY LAPS OF REASON

I am sorry to inform you of a serious misprint in your magazine. Somehow an article called "A Small Case of the Blues" (about MS-DOS laptop computers) slipped into the September '88 *MacUser*. I know this must have been an error. If it wasn't, don't bother explaining. You would just end up sounding like a Wang spokesman: a lot of words with no real meaning.

I, like most of your readers, made a conscious decision to work on a Macintosh. If I wanted to know anything more about using the stone ax of the computer world (that's MS-DOS to some of you fools), I would buy a different magazine. While a laptop Mac

BELINDA MORRISSEY

Letters

would be nice, I would sooner be desk-bound than DOS-bound.

Publishing articles that are trying to sell me porto-DOS is not even in good taste. I am returning the offending pages and hope that nothing like this appears in your magazine again.

JOHN W. CORK
LOS ANGELES, CA

Sorry if we offended staunch Mac supporters, but have you ever tried to work on a plane with your Mac on your lap? — KC

AD HOC AD LIB AD INFINITUM

I just returned from the Boston Macworld Expo and my credit card is two-grand heavier. Along with various software programs, I purchased a Jasmine hard drive. As everyone who attended Macworld now knows, Jasmine packages its drives in an attractive, large, white box with the company logo showing on five sides.

Not wanting to waste time returning to the hotel, I carried the box around all day, from the World Trade Center over to Bayside Expo and back to the Trade Center. Up and down the aisles, at the bus stops, on the bus, in the taxi, waiting in lines, the big box was seen by thousands, many of whom were trying to decide what drive to buy themselves. Seeing me with my purchase seemed to influence them — I could see it in their eyes.

As one person after another asked me about my purchase, I became a salesperson for Jasmine, quoting reviews, touting the drive's quick access time and great warranty. Simple positive reinforcement. They were impressed and went off to buy the product. I saw others with their Jasmine boxes, too.

One pretty girl saw my box just as I noticed hers. She smiled at me and I smiled back. We knew we had made the right decision and were members of the same club. I passed by a guy in front of the Aldus display who was carrying a SuperMac box. He looked at me rather smugly and I gave him a look that a Rolex salesman might give to a Timex owner.

If peripheral manufacturers would take my advice, they would hire young actors to walk around shows carrying big boxes with their logos on them. These actors would be housed in barracks-like buildings near the expo sites. At 11:00 A.M. each morning, they would set out like a fleet of ice cream trucks, on their way to the expo. They would be trained to soft-sell the product and would have read all the favorable reviews. If the questions ever got too tough they could merely excuse themselves, saying, for instance, that their box was getting too heavy.

The retailers would surely sell more of these products on show days and the postshow sales would rise. Companies could divert a fraction of the money they spend on those free paper and plastic tote bags and hire young actors as walking billboards.

Software companies, however, will have to think of something else. I don't think any of us would let Adobe or Microsoft get away with putting their software in boxes big enough to hold an extra large fruit basket.

TOM PAFIK
HOLYOKE, MA

Have you seen the bigger-than-a-bread-basket packaging for Illustrator 88 or Word lately? — JZ

> While a laptop Mac would be nice, I would sooner be desk-bound than DOS-bound. Publishing articles that are trying to sell me porto-DOS is not even in good taste.

SPREAD TOO THIN

After reading the documentation and putting the long-awaited Excel 1.5 spreadsheet update through its paces, I can't believe Microsoft charged for this patchwork update. Can you say, "Seriously disappointed Excel power user," Bill Gates?

Version 1.5 is a stopgap measure that fixes only the worst of Excel's MultiFinder compatibility bugs and adds a few long-overdue features. Microsoft hopes Excel users won't notice the serious spreadsheet competition coming to the Mac arena. The additions were sorely needed; Excel hasn't had a significant upgrade since its introduction several years ago. However, the documentation lists a full page of features missing from the Mac version that were in the PC version delivered months previously. Oh, well ... you got me this time, Bill, but I won't be sending in my 2.0 upgrade money until I see a thorough comparison test with the competition. Can you say "Full Impact" or "Wingz," Bill?

LARAY GEIST
HOUSTON, TX

We knew that you could. — KC

JUST DE FACTO, MA'AM

I object to an underlying assumption in "The Elements of Style" in the September '88 issue. The article is ostensibly about style sheets, not about the two specific programs — Word and PageMaker — mentioned in the first paragraph as examples. Yet there is no mention of Ready,Set,Go!, which I happen to use. It most definitely uses style sheets. We might learn more about style sheets given a little broader perspective. Just because one product is the best selling in its class, it shouldn't be considered the de facto standard. If this were true, we'd all be using IBMs, wouldn't we?

JOHN MOSELY
VAN NUYS, CA

ALL THE NUDES THAT FIT TO PRINT

I am writing to you to thank you very much for your response to the letter from Deborah D. Mason of Cambridge, MA, in the October '88 issue regarding advertisements in *MacUser* for diskettes containing digitized adult graphics.

I applaud your decision to print her

letter even though you disagreed with it, and I applaud your reply because you echo our sentiments exactly. We sell adult graphics because there are people who appreciate them. Our ad responses are carefully tabulated, and if we didn't show a profit, we'd drop the ads. Our adult graphics are not sexually explicit, but classical nude studies meant to be appreciated for their beauty rather than to appeal to prurient interests.

I have a degree in Fine Arts from a southern university where I spent many hours drawing and sculpting the undraped human form. When we began the software business, the farthest thing from our minds was to sell something that would demean women. We leave the hard-core stuff to the sleazeballs and concentrate on the healthy expression of adult sexuality.

There is a movement in this country to outlaw all forms of adult computing materials, whether they be adult BBSs or companies like mine. The insidious thing is that such prohibitions get into the area of First Amendment rights, and if the censors can win in this small area, there may be precedents to prohibit other forms of expression in other areas.

RICK MACNAMARA, OWNER,
GOLD COAST COMPUTING SERVICES

FAIR SHARE

In his June '88 column, Neil Shapiro makes some misguided remarks. First he complains that he received very few payments of the shareware fee for his TILT! stack. Enclosed is a copy of a receipted Educorp check for the shareware fee for his TILT! stack.

Shapiro goes on to state that Budgetbytes asked for permission to distribute TILT!, prompting Shapiro to tout Budgetbytes as the premier company of this sort. He also cites Budgetbytes' price of $3.50 per 400K disk as being "noncommercial." Shapiro doesn't know what he's talking about. These 400K disks have System files on them so, in effect, you get less than 340K of stacks for your $3.50. If you want the stacks on 800K disks, you must pay $6.50, not $3.50. It's ironic because you must have 800K drives to be able to use HyperCard.



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Letters

Educorp's disk prices vary with volume, with an average price of about $3.95 for an 800K disk. Is this noncommercial, Mr. Shapiro?
VAHE GUZELIMIAN
PRESIDENT, EDUCORP

The question "Do you beat your wife?" cannot rightfully be answered with the reply "No worse than my neighbor beats his." Rather than get into a long discussion over the definition of noncommercial, *I personally feel that none of the so-called public-domain disk houses are engaged in noncommercial distribution, but instead are selling the work of other people for their own profit while claiming less commercial motives.*
— Neil Shapiro

THE PENANCE OF PIRATES

Some comments about viruses. I've had experience with Scores — nearly every machine in the building was infected by it. The only way I can explain the spread of it was through the use of pirated commercial and shareware software (some from users; some from a dealer!). This phenomenon has been rampant at our institution, and I feel like Don Quixote at times. Nowhere in all the discussion and hand-wringing about viruses that has gone on in your publication and others do I see mention of this aspect of the phenomenon. I hate viruses and their parents, but I very much appreciate the fact that the turkey is coming home to roost.

People who pirate software (which you have also rightly condemned) are being caught with their proverbial pants down by these viruses. I say three cheers, in this case, for viruses! People who deal in unscrupulous, immoral practices deserve to "get sick." Of course, so do the virus creators.

In the article "Razor Blades in Apples," the only solution suggested for removing Scores is to delete every file in sight. I think that is drastic, especially in the case of the System file. There are effective surgical techniques for cleaning out the System without erasing it. (Admittedly these procedures are not for everyone, since they involve the use of ResEdit.)

People who pirate software are being caught with their proverbial pants down by these viruses. I say three cheers, in this case, for viruses!

Other than the fact that I can't properly read *MacUser* at lunch anymore because of its size, I love your magazine.
J. GARY EPPEL
TORONTO, ONTARIO

We stand corrected — but with our proverbial pants up. We skipped over ResEdit as a cure because our aim was to cover the simplest techniques for combatting viruses.

Contact your local user group for more details on how to use ResEdit to excise viruses from your System.
— KC

DOS ON THE DE-CLINE

The letter from Dr. Foster W. Cline in the July '88 issue of *MacUser* is just too much to ignore. I do hope Dr. Cline is more knowledgeable about medicine than he is about computers and database programs. His statement, "I feel that the Mac is not a true business machine," would surely meet with disagreement from many thousands of Mac users who daily conduct business on the Mac. Even more absurd is his request that *MacUser* let people know that databases in the IBM world are hundreds of times faster.

I challenge Dr. Cline to a real-world test of retrieving a single record from a database. I'll use OverVUE on a Mac Plus without the turboboards mentioned by the doctor. If his Leading Wedge and whatever DOS database program he uses is 100 times faster, I'll travel to Evergreen, Colorado, and pay Dr. Cline to conduct my next annual physical.
CORKEY SANEL
COLLEGE STATION, TX

Dr. Cline's opinions are to be expected; after all, a doctor a day keeps the Apple away. — JZ

REED-ONLY MEMORY

There's no denying the fact that the Mac has made it big in the music industry. A few months ago I had the pleasure of seeing Sting in concert. He had a Mac SE *on stage* actually *being used* by none other than Branford Marsalis, and Branford handles a mouse nearly as well as he handles a saxophone.
NELSON HAUKAP
CARROLL, IA

Hope he doesn't get the two of 'em mixed up. — RI

SO YOU WANNA BE IN PIXELS?

There are some gaps in the Mac software market that you might want to call attention to:

- Business graphics. Why isn't there a good business graphics package for the Mac? I bought Microsoft Chart several years ago for my Mac at home and recently bought Cricket Graph for my Mac at work. Neither of these is comparable in power or flexibility to packages such as Picture Perfect available on the IBM PCs. Since the Mac is touted as a better graphics machine, it is ironic that in this important segment of the graphics market the software just isn't there.
- Business images. With the Mac as popular as it is in the desktop-publishing and presentation arenas, it is amazing that there is so little available in the way of business images. There are a couple of collections available (like ClickArt Business Images), but nothing like the collections available with a package like Diagraph in the IBM world. They have symbols and diagrams of factories, machines, and processing equipment by industry. The irony is that Diagraph is light years behind Mac programs in its ability to

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TBBA



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Letters

move and manipulate images, but comparable collections of diagrams and symbols are not available for the Mac.

There seems to be an opportunity for someone to offer similar image libraries for the Mac. (I'm tempted to start digitizing Diagraph images with my Thunderscan.)

PAUL B. EVANS
TRUMBULL, CT

. . . AND DAT'S THE TRUTH

I enjoyed your September '88 issue but noticed a slight error in The Open Window column. *DAT* does not stand for Digital Analog Tape (an amusing contradiction in terms). It is an abbreviation for Digital *Audio* Tape.

PAUL A. LANE
MADISON, WI

DELIRIUM TREMENDOUS

I have wanted to write for some time to thank you for putting out the best Macintosh magazine that money can buy, but now I have mixed feelings. I guess it's my fault though, because when I left for my summer vacation in June, I forgot to leave my forwarding address. As a result, when I got back last night I was in ecstasy to find three issues of *MacUser* waiting to be read by my hungry eyes. I'm not sure when exactly I fell asleep, but I woke up the next morning with a terrible headache (have you ever tried to read 1,036 pages of *MacUser* in one sitting?).

All night long I had nightmares about things like John Dvorak becoming a Macintosh software evangelist and our friends in Cupertino asking Steve J. and Steve W. to come back and help finish the Mac III, oops, Mac II+. I guess you can get too much of a good thing. Having recently sent in my request for three more years of *MacUser*, I now find myself praying that they don't all come on the same day. A person can only take so much.

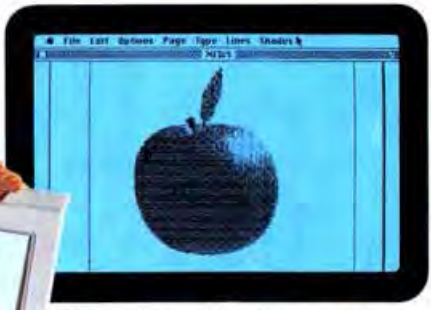
JAMES GLEASON
SALEM, OR

The MacUser Gnome informs us that the nightmares will cease if you place a copy of the latest issue under your pillow before retiring. — JF

Finally, the kind of scanner you've always wanted for your Macintosh.

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Preview Scan. To add another image without leaving your application software, pull down the scanning desk accessory and begin with Preview Scan from the menu.



Edit/Paint. Bring in DeskPaint to touch up your images. Menus and point-click commands make it easy.

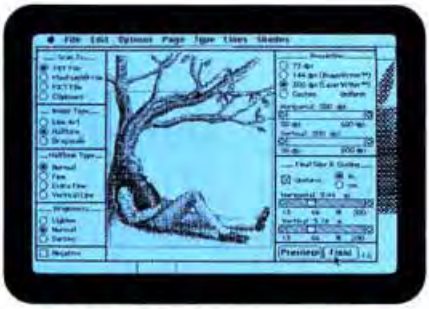


Place. Bring in your masthead from memory, place the scanned images wherever you want, copy and place multiple images, key in text, wrap, enlarge or shrink to fit.

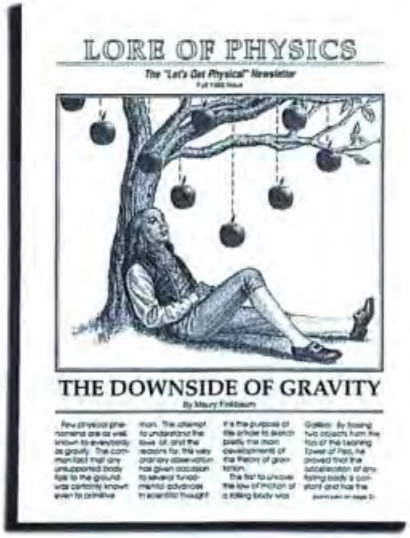
The HP ScanJet scanner puts you several steps ahead of other Macintosh-compatible scanners. Because our desk accessory approach lets you scan, edit and paint images all together on the screen. Without having to jump from one application to another. HP's Desk Gallery software makes it all possible. So you can add the impact of photographs, illustrations and logos to your presentations, proposals, sales

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The latest and still the greatest? You decide. SuperMac has just released PixelPaint Professional.

Fresh Pixel-Paint on Palette

SuperMac's latest revision of its color graphics package, PixelPaint Professional, sets a new standard by adding features aimed at artists and color desktop publishers. Among the new features are support for Pantone colors, which are widely used for spot color in magazine and advertising production; a wider work area (1,024 x 1,024 pixels); and a four-color-separation utility that is built into the program.

While still locked in the 8-bit, 256-color hardware limitation of most Mac II systems, PixelPaint Pro uses dithering (alternating pixels) to simulate shades of a color. This frees up the palette for a wider range of tones. Another new utility is PixelScan, a color-scanning utility.

PixelPaint Pro goes for $595. (The upgrade policy from versions 1.0 and 1.1 was not set at press time.) It's available from SuperMac Software, P.O. Box 390725, Mountain View, CA 94039; (415) 964-9694.

— Ben Templin

Color In, Color Out

One of the real problems with color on the Mac is getting it in and then out. That's because color input and ouput devices are only beginning to appear.

One of the few available color input devices comes from Truvel Corporation. Truvel uses a hardware platform that's very different from other Macintosh scanners: an open flatbed design combined with a traveling tower that contains a digital imaging device and zoom lens. The zoom lens varies the optical resolution from 300 to 900 dots per inch (dpi) — many other scanners are limited to 300 or 400 dpi. At 300 dpi, the scanning width is 12 inches, compared with 4 inches at 900 dpi. Truvel's 17-inch flatbed can hold anything from a single sheet of paper to an object 2 inches thick.

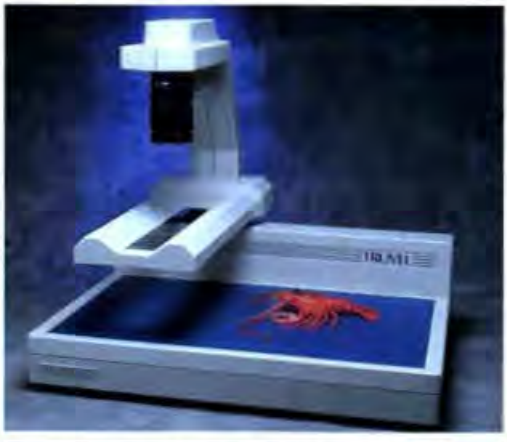
Combine these hardware features with Truvel's software and you have resolutions that vary from 75 to 900 dpi, real-time feedback for control over the final image, and single-pass color imaging.

The latest in Truvel's series of color scanners is the TZ-3BWCT ($12,590), which digitizes both negative and positive transparencies having a film width from 35 millimeters to 12 inches. It captures 256 colors or 256 levels of gray. If 256 colors aren't enough, Truvel's TZ-3CT ($11,590) captures up to 16.8 million colors, for photographic-like reproduction.

But not everyone lives in the colorful world of art. Some, like radiologists, deal mostly in grays. So Truvel is releasing the TZ-3X ($12,690), which digitizes X-ray films so physicians can use image processing to better identify elusive objects.

For more information, contact Truvel Corporation, 8943 Fullbright Avenue, Chatsworth, CA 91311; (818) 407-1031.

— Gil Davis



Truvel's scanners feature a tower that sweeps across a black and white or color document to create a digitized image that can be pasted into newsletters or advertisements.

Deneba MUGs Demos

Does your user group want to do software demos? Do you pound your head in frustration when publishers won't send you their programs or return your calls? Well, try Deneba Software.

Deneba has established the Deneba Demo Club to provide Mac user groups (MUGs) with complete copies of the Deneba software line. User groups send in a one-time fee of $25 plus $2 shipping and request one of Deneba's packages: CANVAS 2.0, CANVAS DA, Spelling Coach, Spelling Coach Professional, BigThesaurus, or Comment 2.0. Once a group receives a package, Deneba asks that it be demonstrated at a meeting and reviewed in the group's newsletter. Once Deneba receives a copy of the review, the $27 fee is rolled over and applied to the next Deneba product the group requests, and this can continue indefinitely.

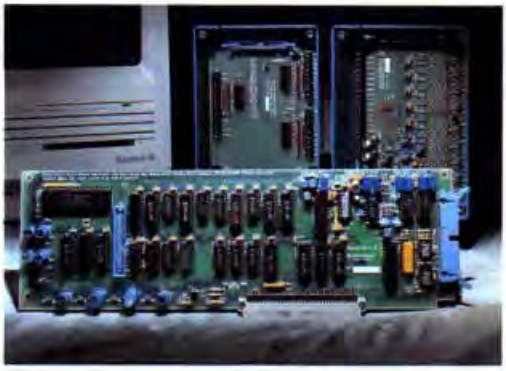
To participate in the Deneba Demo Club, a user group's designated representative (only one per group) should send a written request on the MUG's letterhead to Deneba Demo Club, c/o Deneba Software, 7855 Northwest 12th Street, Suite 202, Miami, FL 33126.

— Russell Ito

Say Hola to ADIOS

Here's a junior that's more than a chip off the old block — it's a whole *board* off the old block. The MacADIOS II Jr from GW Instruments is a low-cost (relatively speaking) version of its data acquisition board for the Mac II. It comes with GW's TurboDriver I/O software that handles all the in-

PETER A. GOULD



Data? You need data? GW Instruments has just released the MacADIOS II Jr, a low-cost addition to its MacADIOS line of data-acquisition boards. Mac SE owners can use this Mac II board with an optional expansion kit.

put and output functions to and from the board. TurboDriver's features include interrupt-driven background tasks, spooling to a hard disk, an oscilloscope, and a spectrum analyzer.

GW has also announced the MacADIOS ABO and MacADIOS DBO Breakout Systems, which provide additional analog or digital input terminals for users with specialized instrumentation needs.

And for users who want to use the MacADIOS II Jr but don't have a Mac II, GW Instruments has also introduced an SE expansion chassis that lets SE owners use the same card. The expansion chassis lists for $600.

The price for complete MacADIOS II Jr systems ranges from $1,000 to $10,000. You can find out more by contacting GW Instruments, 35 Medford Street, Somerville, MA 02143; (617) 625-4096.

— Russell Ito

Symantec's Magic Show

The magic may have been invisible, but Symantec's show wasn't. Calling in industry heavyweight Jean-Louis Gassée and comedian/magician Harry Anderson, the company staged a major roll-out announcement for new versions of six packages that will be shipping in the third and fourth quarters of this year.

MORE II is the latest incarnation of the familiar outlining program. The enhancements include integrated word processing, a color drawing environment, and improved presentation graphics for creating slides and transparencies. As part of the presentation capabilities, Symantec has signed an agreement with MAGICorp to create slides overnight. With this, a user can select the MAGICorp print option and automatically send the slide data to MAGICorp via modem.

For developers and hackers, Symantec introduced four language-related packages: Macintosh Pascal, Just Enough Pascal, THINK's Lightspeed Pascal, and THINK's LightspeedC. Apple has transferred all marketing rights for Macintosh Pascal to Symantec, and Edutech, Symantec's North American higher-education agent, will offer site licenses and volume purchase agreements to universities. Just Enough Pascal is an add-on to THINK's Lightspeed Pascal that teaches users how to program in that language by actually building an application. THINK's Lightspeed Pascal version 2.0 is a fully integrated development environment that includes a compiler and a source-level debugger. THINK's LightspeedC version 3.0 also incorporates a source-level debugger — the only one available for debugging in C.

The final product announced was InBox version 3.0. InBox's new architecture lets it run on TOPS and AppleShare networks, as well as on its own server. It also offers third-party developers gateway support for access to other electronic mail services.

The suggested list prices for these goodies are: MORE II, $395 ($89 upgrade for current owners); Just Enough Pascal, $75; THINK's Lightspeed Pascal, $125 ($49 upgrade), and THINK's LightspeedC, $175 ($69 upgrade). InBox's price depends on the number of users licensed, and no price had been set for Macintosh Pascal at press time.

To find out more, contact Symantec at 10201 Torre Avenue, Cupertino, CA 95014-2132; (408) 253-9600.

— Russell Ito



Keys and QuicKeys

Looking for an economical alternative to Apple's extended keyboard? Consider this package. Ehman Engineering has bundled its 105-key ADB Extended Keyboard with QuicKeys (CE Software's $99 macro program for customizing your keyboard) and is offering the pair for $199.

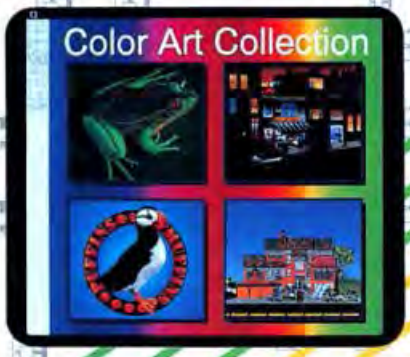
At first glance, the ADB Extended Keyboard looks a lot like the Apple keyboard. A closer look shows that the keys are set higher and angled for comfort. The Return key is enlarged, and LED indicators are present for the Caps Lock, Num Lock, and Scroll Lock functions. A double-click key switch response helps keep your flying fingers from flying out of control.

Contact Ehman Engineering/Cutting Edge, 97 South Red Willow Road, Evanston, WY 82931-2126; (307) 789-0582.

— Laura Johnson

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How Do You Like *Them* Apples?

CUPERTINO, CA — Apple raised prices significantly for Macintosh SE and II computers on September 12. The fate of stripped-down CPUs suffered the worst, with the list price for a Mac II with no internal hard disk rising 29 percent to $4,869. By comparison, a fully configured Mac II with a 40-megabyte internal drive only rose 11 percent, to $8,298.

SE prices also rose, with a bare SE going up 14 percent to $3,298 with a standard keyboard (or about twice the price of a Mac Plus, whose price remains $1,799). Apple cites the rising cost of memory chips and the increased demand as its reasons for the price hikes.

Icon Review Lives

MONTEREY, CA — Icon Review, a mail-order marketer, is expected to reopen for business under its own name after being purchased by Micro Marketing International (MMI). MMI acquired Icon Review's name and some of its business assets after Icon Review filed for Chapter 11 protection from its creditors. MMI has marketed PC computer peripherals for seven years.

TV on My Mac

CAMBRIDGE, MA — Slip a compact disc into a Mac II and settle back for an hour or two of color movies played through the Mac's video monitor. This technological breakthrough took place at MIT's Media Lab with the help of Apple, which manufactured five special video boards that processed a signal coming from a compact disc whose data had been greatly compressed. The researchers don't know how long it will take to bring "Movies of the Future" to commercial viability, but the development is seen as a solid step toward the marriage of computers and television.

Informix Versus Investors

MENLO PARK, CA — An Informix Corporation investor has filed a class-action suit against the developer of Wingz, claiming Informix made "false and misleading statements in reports to stockholders" about its financial condition and its merger with Innovative Software of Lenexa, KS. Informix attorney David Stanley said the lawsuit is without merit and will be vigorously pursued. Informix is a leading supplier of SQL database products. The company's first Mac product is the long-awaited Wingz spreadsheet, which was still unreleased as of press time.

Borland Cuts 88 Workers

SCOTTS VALLEY, CA — Borland International laid off 88 of its 675 employees in August following an announcement that the five-year-old company will experience a small loss from the restructuring. Since its founding in 1983, Borland has grown in sales from $1.1 million to $81.6 million for the ending in March '88. But while sales increased sharply, pre-tax profit margins fell from 16.5 percent in 1986 to 4.6 percent in 1988. Borland is trying to decrease expenses to increase net income.

Speaking Out: First Reactions to the Mac IIx

Apple's new high-end computer, the Macintosh IIx — with its Motorola 68030 microprocessor and 1.4-megabyte floppy drive — is already generating a lot of excitement among users who are weighing the IIx against Sun, NeXT, and other power platforms. We asked several industry leaders for their reactions.

"The biggest contribution the IIx makes to Macintosh technology is its on-chip memory management. By having this important capability right inside the IIx's 68030 microprocessor, you'll get higher performance than by adding a 68851 (memory management chip) to the II. In addition, you'll get the potential of a much more robust operating system software and true multitasking."

— Michael D. Boich, President of Radius

"There's no question the Macintosh IIx will be a great machine. I applaud Apple for doing it. The way I look at it, if I'm sitting at my Mac and it takes 30 percent less time to do the same thing, that's an instant gain in productivity. And, faster is better because faster is fun."

— Philippe R. Kahn, President and CEO of Borland International

"For companies like ours, the Mac IIx isn't a quantum leap above the Mac II and that computer's 68020 processor. We publish software primarily for business applications, where people want to maintain compatibility instead of having to buy and learn new software that's written for the 68030's advanced capabilities. Where I think the Mac IIx will open up markets is in high-end areas such as science and engineering. We need to open up that market, which will help everyone, even those of us who sell business software."

— Heidi Roizen, President of T/Maker

"The Macintosh IIx is great. It's a natural evolution of the Mac II line in the direction of more power. But to realize the real potential performance of the IIx's 68030 microprocessor, software developers are going to have to write programs that take advantage of its memory management and its ability to keep applications running in spite of a crash. I think the Mac is good now, and its future looks great."

— Gordon E. Eubanks, Jr., President and CEO of Symantec

Thin Bits . . . **Apple's** AppleShare 2.0, which was supposed to ship in July but was held up to fix a bug, was distributed to dealers in late August. The new version lets a network manager carry out administrative tasks without shutting down the file server. . . **Apple** has also bought speech- and handwriting-recognition technology from the now defunct **Airus Inc.** General Computer Corporation has changed its name to **GCC Technologies**. . .



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Novell presents a net even the pickiest

Macintosh owners have a reputation for being fanatical about their Macs. And rightfully so, when you consider the elegance of the Macintosh user interface.

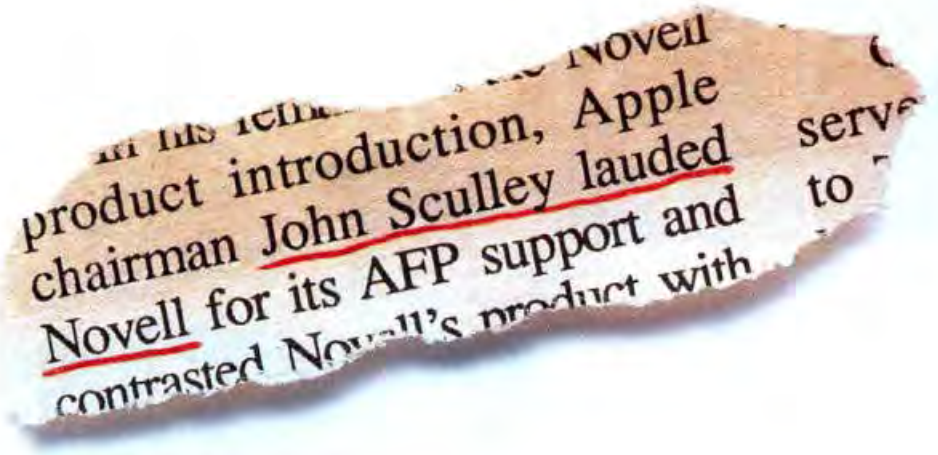
So when Novell set out to network the Macintosh with PCs, it was with one clear caveat: preserve the Mac environment. Create network software that would feel right to the pickiest of all Macintosh users. And none are pickier than the ones at Apple.

Full AppleTalk compatibility. Working directly with Apple, Novell's programmers created a version of NetWare® that is compatible with the AppleTalk File Protocol (AFP). It's an achievement hailed by Apple President and CEO John Sculley as "a very significant event for the industry." And it means that Mac users can now get all the power and flexibility of the number one local area network in the world, without sacrificing any Macintosh functionality.

AFP compatibility also means that NetWare for Macintosh will be fully compatible with future Macintosh hardware and operating system versions. So you can take advantage of new Macintosh product releases as soon as they become available.

Freedom to choose. NetWare for Macintosh lets you connect Macs with a

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InfoWorld, June 20, 1988

work made to satisfy Macintosh user.

myriad of PC, minicomputer and mainframe environments, including OS/2. So you can choose the workstation environment that best suits your needs while communicating easily between dissimilar operating systems and sharing files and peripherals.

You get all the performance, security, fault tolerance and functionality of NetWare without changing the way you work with your Macintosh. And you get the power to transparently connect to over two million NetWare users worldwide.

To satisfy your need for a powerful Macintosh network, plug into NetWare—the network that passed the ultimate Mac test drive. See your Gold Novell Authorized Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NVMC16.

NOVELL

For network solutions, you should be seeing red.

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Thoroughly Modern MIDI

No, you can't run the next release of Excel from your DX7, and Word is unlikely to start shipping with the Sonata font preinstalled, but Microsoft Press has nonetheless entered the uncrowded field of cogent introductions to MIDI with *Music Through MIDI*, by Michael Boom. This is an introduction to MIDI, so you won't learn enough to write your own patch librarian. But if you're puzzled by the ins and outs of MIDI connectors, system-exclusive messages, or SMPTE, here's the place to find a straightforward explanation.

Although Microsoft Press brings no special knowledge of the music industry to this venture (that's "famous producer" *Glyn*, not Glenn, Johns), Boom hits the right notes for MIDI neophytes. The rest is up to the musician in all of us. If you think you're ready for a position in MIDI management, you can find out more from Microsoft Press, 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717. It costs $19.95.

— James Bradbury

Music for Minors

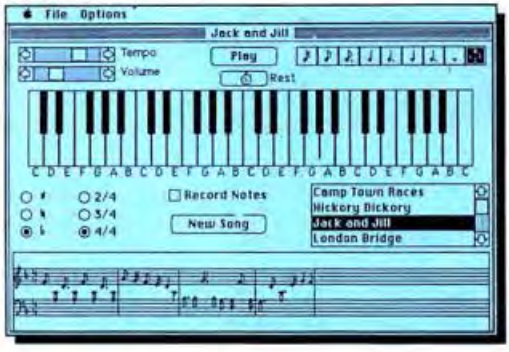
Hey, it's KidsTime! Come on, let's switch on the Mac and lay down some track! Dig this funky "Mary Had a Little Lamb," "London Bridge," and coming on strong with a bullet, "Hickory Dickory Dock"!

Well, no, KidsNotes — the music section of KidsTime, a package of five educational games for young children — doesn't exactly swing, but do you really want your three-year-old cranking out "Louie Louie" at 6 A.M. on a Sunday morning? What it does do is provide a basic music-construction environment that allows children to play and record single-note songs either by clicking the mouse on an on-screen piano keyboard or by using the bottom two rows of keys on the Macintosh. With each entry the program displays a note on a staff, and you can edit notes by pointing and clicking. For those children who are — shall we say — premusical, you can play a list of top-ten toddler tunes by clicking on the song titles.

Meter options include 2/4, 3/4, and 4/4, and you can play in the keys of C, F, and G; volume and tempo are adjustable. Rhythmic values extend from sixteenth to whole notes. And if you've heard "Twinkle, Twinkle, Little Star" 87 times in a row and suggest that your little one "give it a rest," KidsNotes can do that too!

For more information, contact Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066; (408) 438-1990. The list price for KidsTime is $49.95.

— Christopher Breen



I Want My M3TV

That's M³ as in "Macintosh, MIDI, and Music" — which just happens to be the subtitle of a new music video from Apple. (Its first name is "The Open Door.") If you think you want to do MIDI but aren't sure what it is, you can find out in 33 minutes. And while you're at it, you can also find out who's who in the world of Mac music. In fact, you might feel left out at the end if you haven't done MIDI.

The beginning of the video could be mistaken for an "Entertainment Tonight" segment.



You'll see clips from interviews with such big names as Carlos Santana and Laurie Anderson telling you how "It" has changed the way they think and work. After a few minutes, however, you get to the crux of the video — MIDI sequencing, notation, publishing, sampling, and sound editing. If you think having all this music technology crammed into such a short video is overwhelming, think again. Apple does an exquisite job of putting the pieces together.

And the celebs do serve a purpose other than being who they are — each discusses how he or she utilizes MIDI in music. David Wilsey (billed as an emerging talent) discusses his use of the MIDI guitar in terms of sound designing. Santana raves about the benefits of doing notation and sequencing in a Mac environment. And the true confessions don't end there. Anderson shares her initial apprehensions about using a computer to write and arrange music. You'll be converted into a Mac/MIDI musician in half an hour. To get the $12.95 tape, call (800) 538-9696, extension 750 (sorry — it's only available in the U.S.).

— Kristi Coale

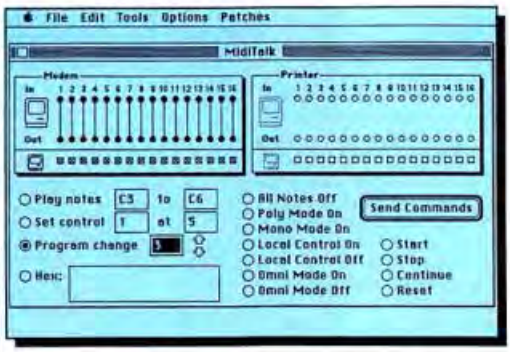
PETER A. GOULD

Pick a Pack of MIDI

You're working on the seventeenth and last track of that sequence for the industrial-park spot. Your partner calls in with the bad news. The client wants eight seconds of music taken out and the beat slowed down "just a hair." Also, those string things you put in might sound nicer as horns and bagpipes. Now, if the sequence is 38 measures long but you subtract 6 and play it over 51 seconds and repatch that rack over there and....

CTM Development comes to the rescue with MidiPack, a disk of three accessories that can make situations such as this less painful.

MidiPack includes BeatMaster, a rhythm and time calculator that handles comparative problems of measures, tempo, and duration. You enter two known sets of values and BeatMaster gives you the third. No problem — 32 measures of 4/4 spaced over 51 seconds gives you a tempo of 151.3. Calculations for region (measures, quarters, and clocks) and duration (minutes, seconds, and frames) are just as easy.



The MidiTalk window has two main parts: the THRU matrices and the TALK controls. The THRU matrices act as a mapper (a MIDI patchbay) that lets you redirect incoming MIDI data to any number of the 16 MIDI outs. Want your Yamaha to play the Roland bagpipes instead of the Casio strings? Simple, just drag the "cable" from the Casio CZ101 synth in channel 2 to the Roland D-50 in channel 6. You can then store these different patch setups in the Patch Library. (But be careful. It might have been my system configuration, but I ran into trouble here; I had more bombs than the Pentagon when I tried to do this. A new version, due out by the time you read this, may resolve these bugs.)

The TALK controls provide a way to send MIDI messages to connected devices. You can enter this information through hexadecimal code or choose the buttons that control often-used commands such as Omni On/Off, Mono On/Off, and the all-important command, All Notes Off.

Another window, Program Change, is a translator among different MIDI instruments. It tells you what corresponding number will be called up in your slave machine when you enter a patch change on your master device.

MidiPack is intended to be used with MultiFinder so that it can operate in the background of a sequencer program. The program is copy-protected but allows for two transfers to hard disk. Patchworks, another CTM package due out by now, is a librarian/editor utility for MIDI patchbays and mixers. Both MidiPack and Patchworks come with Inside MIDI, a desk accessory containing a condensed version of the MIDI spec for quick reference.

For more information, contact CTM Development, P.O. Box 996, Menlo Park, CA 94026; (415) 323-5054. MidiPack lists for $80; the price for Patchworks had not been set as of press time.

— *Christopher Breen*

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Scale Models

Do you think Lydian was a tattooed lady? Do you sometimes confuse your mixolydians and locrians? If you think phrygian is a geometry theorem, there's hope for you in the form of Guitar Wizard from Baudville. This on-screen tutorial program (actually a collection of four small programs: Chord Wizard, Scale Wizard, Fretboard Wizard, and Improvisation Wizard) helps beginners practice chords and learn about fretboard harmony.

If you're like most Mac users, you don't read manuals, but in this case you should. In the *Short Primer on Fretboard Harmony*, Baudville includes explanations about chords and scales, how they're constructed, and how they relate to each other. You'll also learn a little about intervals, although Guitar Wizard won't take the place of a class in music theory.

In Chord Wizard, you locate standard chords at different positions on the guitar neck and learn about the fingering, intervals, and notes for each. Scale Wizard provides the same information for scales. Both of these programs are meant for standard guitar tuning only. Advanced players can try out altered tunings of chords and scales in Fretboard Wizard and Improvisation Wizard. If you're an instructor, you can print out the fingering screens for various notes for use in classes.

The program itself is pretty straightforward; the only complaint I have is that it ignores left-handed players The fretboard and all the fingering, intervals, and notes are positioned for right-handed players. Most guitarists play right-handed, but for those of us who don't, trying to reverse the fingering is confusing when you're trying to keep the positions straight while figuring out scales and intervals. A programmer at Baudville said the company may make a lefty version if there's enough interest. If you don't want to be left out, contact Baudville at 5380 52nd Street SE, Grand Rapids, MI 49508; (616) 698-0888. Guitar Wizard lists for $34.95.

—Kristi Coale



Unlimited Storage

Removable hard-disk drives let you expand your storage capacity by just popping in a new cartridge. Floppy disks offer the same upward storage mobility, but they can't store files larger than 800K, and downloading the contents of a hard disk to floppies could take hundreds of disks.

Removable media with as many as 44 megabytes on a cartridge are more practical for many people who produce large files that can rapidly fill up nearly any hard disk.

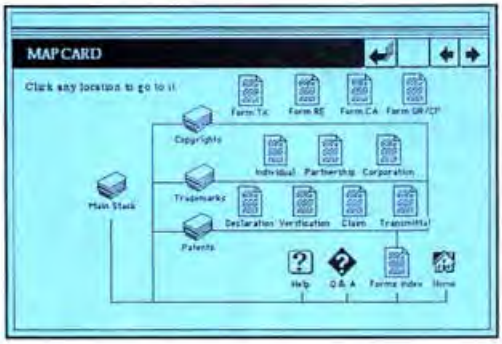
New to the 44-megabyte market is Peripheral Land with its Infinity 40 Turbo that offers an average access time of 25 milliseconds — faster than many hard disks — and a 5-inch-square removable cartridge that can be mailed or tucked away in a vault. Infinity 40 Turbo includes two printing spoolers, a file locator, and a backup utility. It lists for $1,795, and additional cartridges are $169 each. Mass Micro and PCPC have previously released similar 44-megabyte removable drives.

Iomega's Bernoulli Box II offers similar capabilities but uses a different technology. It comes in single- and dual-drive formats ($1,650 and $2,550, respectively) and uses a 20-megabyte, 5¼-inch-square cartridge, with an average access time of 40 milliseconds.

Iomega says the Bernoulli Box has a higher reliability than a normal hard disk because its slightly flexible media is drawn up to the recording head, thanks to the aerodynamic effect discovered by the eighteenth-century physicist after whom the product is named. The dangers of head damage are thereby reduced, because any foreign particle disrupts the aerodynamic attraction between the head and media, thus opening up a clearance for the particle.

For further information about the Bernoulli Box II, call or write Iomega Corporate, 1821 West 4000 South, Roy, UT 84067; (801) 778-3170. Peripheral Land is located at 47800 Westinghouse Drive, Fremont, CA 94538; (415) 657-2211.

— Gil Davis



Patently Yours

It's 2 A.M. Your latest invention, a three-sided floppy disk, worked beautifully in your Mac and you're sleeping like a baby on a gently rocking boat. Suddenly a bomb goes off in your subconscious and you awaken to screaming alarms. You've perfected your disk — now how do you protect it?

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— Laura Johnson

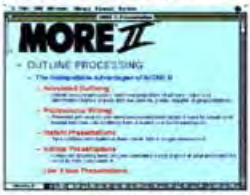


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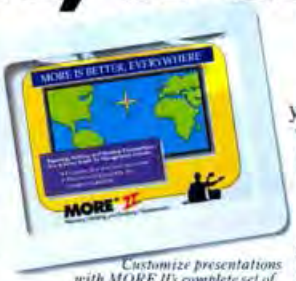
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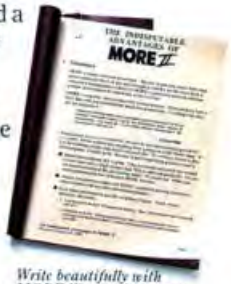
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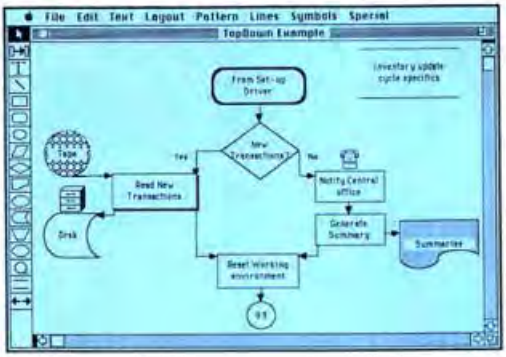


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View From the Top-Down

There's no escape from the flow diagram. Sometimes it masks itself as an organization chart, a project plan, a training tool, or a process description. But basically, the flowchart's boxes and lines are here to stay. Luckily, the Mac makes creating one somewhat less painful; most of us need all the help we can get.

TopDown will gladly assist you by offering you a dedicated flowcharting environment and an eight-color palette of American National Standards Institute (ANSI) flowchart symbols. You simply select a palette item, and the next thing you draw will be that shape. This symbol palette also contains 24 bit-mapped icons (32 x 32 bits), which can be customized in a fat-bit mode. This version does not yet support custom symbols.

You connect the symbols with common-looking lines, but — unlike a typical drawing program — when you move a symbol, TopDown adjusts the connecting lines to retain the connection among your symbols. Best of all, it does its best to retain right-angle and straight connections. Most symbols have unlimited connection points around their perimeters.

You can easily exchange one shape with another, even if the replaced shape is already connected. You can even attach electronic sticky notes to your diagram elements and hide or show the notes at will. Any symbol can be linked to a more complex process — essentially another complete flowchart — that can be viewed by expanding the symbol. This reduces clutter on the screen and offers an unlimited capability to divide your process into subprocesses. TopDown can also point out possible inconsistencies in your diagrams (such as outputs with no inputs).

TopDown can generate space-indented outlines from your diagrams and export them as text. Diagrams can be exported as MacDraw-compatible graphics through the Clipboard. The program also imports PICT images for embellishing your charts. TopDown costs $295 and flows to you from Kaetron Software, 11318 Ericston Drive, Houston, TX 77070; (713) 320-0278.

— Salvatore Parascandolo

The Hung-Up SE

Uh oh! Your SE is hung up again. But this time it's not a bug or a crash. This SE is hung up on your wall — where it reveals its mysterious "innards."

Poster Dynamix's full-color poster shows a Macintosh SE with a see-through case. Major components — the 68000 processor, RAM, power supply, and eleven others — are labeled, with a description of each.

The 22-x-28-inch poster was created from photographs using airbrush and Adobe Illustrator enhancements. It is available for $30 framed or $15 unframed and is shipped free of charge in the United States. Order this beauty from Poster Dynamix at 100 Ferguson Blvd., Coffey, MO 64636; (800) 634-2132 or (816) 533-4575.

— Laura Johnson



Macintosh SE

Frugalware

Price is important to most of us when we buy software. But if you admit that aloud around software salespeople, you might find yourself pigeonholed as "price sensitive." Some of those marketing folks figure that the Mac is a relatively high-priced machine that people buy when they want to increase their productivity, so they act as if pricing is a secondary consideration.

So, for the one or two people who are still reading this story, let's look at two new programs from Broderbund that slide under the $150 price barrier.

Drawing Table is a $129.95 black-and-white drawing program that can create fliers, posters, logos, letterhead, illustrations, maps, diagrams, and floor plans. Especially helpful — and unexpected at this price — are its binding of text to lines and curves and its importation of files created in other programs and saved in Encapsulated Postscript Format (EPSF), PICT, or paint formats. Drawing Table includes extensive libraries of clip art that you just drag into an open window without cutting or pasting. In addition, 32 levels of zoom let you look at details, overviews, or multipage drawings.

TypeStyler is a $149.95 program that creates and edits display type in dramatic ways that used to require a graphic artist or expensive typesetter. Using a mouse, you can bend, squeeze, stretch, twist, or rotate text, and then you can add shadows, shades, patterns, and colors. TypeStyler works with most drawing, painting, and page-layout programs, and it imports and exports paint, PICT, and EPSF files.

Drawing Table should be available by the time you read this, and TypeStyler is expected to ship in December. For further information, contact Broderbund Software, 17 Paul Drive, San Rafael, CA 94903-2101; (415) 492-3200.

— Gil Davis



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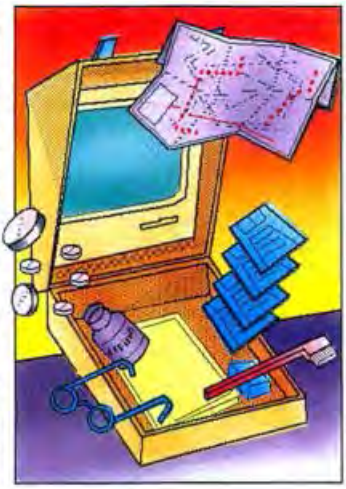


by Neil L. Shapiro

It's a Hallworld After All

So how was Boston? Glad you asked! The Boston Macworld Exposition, for this reporter/exhibitor, was a combination of excitement, confusion, frustration and a general feeling of déjà vu. And I'm not talking about the exhibits. I'm talking about how the show is run and how a show such as this one "fits" into a city such as Boston. I'm not going to go into the various exhibits I saw there as I'm sure almost everything I would mention in this column would be just double or triple coverage to articles and columns in the rest of the magazine.

Instead, I'm going to come out and say something that I hear hundreds of people say in the course of a year but that is rarely said in print — the Boston show has just got to go.



DIDIER CREMIEUX

A NICE PLACE TO VISIT . . .

Certainly many fine things can be said about the city of Boston. And, before I continue this, I want everyone to understand that I consider Boston to be one of the most exciting and rewarding American cities to visit. From historical, recreational, educational, and purely fun viewpoints, few cities can match what Boston has to offer a vacationer.

But from the viewpoint of a person attending a major convention, it leaves a lot to be desired.

The good news is that, this year, the Bayside Exposition area was not so hot as to be uninhabitable by carbon-based life-forms. Instead, after the usual air-conditioning problems, they managed to keep it simply hot enough to be extremely uncomfortable. Still, walking around that crowded, sweat-making hotbox with a typical bag containing software, brochures, candy mints, press releases, business cards, and comic books (well, I stopped at Boston's Million Year Picnic comic store) was an experience that can only be compared to what the Army calls "humping" a full pack on a long march.

It seems that many of Bayside's problems for the convention-goer can be attributed to the building's historical problems. Besides the air-conditioning problem, most conventioneers have probably noted that the place has more niches than the Vatican. It's just not built like some of the world's better convention halls (such as the Las Vegas Exposition Center, New York's Javits' Center, and so on). That's because it was originally designed, according to some native Bostonians I spoke with, as a shopping mall. But the developer ran out of money. So if you can't have Filene's Basement you might as well have new cars and computers.

AN UNHOLY TRINITY

So, as in most years, Bayside would have provided enough problems. But this year we were treated to something new, something that would make previous years at the Bayside Sauna seem like fond memories.

This year they arranged for "three venues." (*Venue* is double-talk for "a place.") Bayside just wasn't big enough this year, so the show was split like a King Solomon baby that no one really loved.

The exhibitors were split between Bayside and Boston's World Trade Center building. Conference speeches went into the Wang Center.

To say this was inconvenient for the conventioneer is reminiscent of the slogan "Nuclear Warfare: It Can Ruin Your Whole Day."

I admit that the convention organizers — Mitch Hall Associates — tried their best to pull off the impossible. This year, as if realizing that the slightest problem would be magnified by the event's own unwieldy size into a screwup of magnificent proportions, I saw the staff work harder than ever. But they couldn't work miracles when heat and traffic conspired to turn the show into Hall's vaporizer.

NEW ON THE VENUE

The shuttle buses between the World Trade Center (and, New Yorkers, we are not here talking about twin towers scraping the sky but an old, smallish building down by the lobster docks) and Bayside were about as good as you could expect from a fleet of buses. Many people, maybe the majority, found that they were not so bad except for the delays caused by Boston traffic which seemed to average more than 45 minutes.

It's the horror stories, though, that make you breathe a silent sigh of guilty relief if you were one of the lucky majority. One person I know showed up to meet me at the World Trade Center looking as if he were in the final throes of a terminal respiratory disease. The

bus's air-conditioning system had died, and the windows would not open. Then there was the fellow whose bus driver got lost in Boston (not hard to do, as I found out in a rental car, but not something you'd expect from a professional bus driver) and who took literally hours to get from one area to the next.

LOOK VENUE LEAP

At any rate, if you could get to the various "venues," you quickly noted that some areas were more populated than others. I don't have the figures, but it seemed to me that the World Trade Center was simply not as active as Bayside; the likeliest explanation is that people were used to Bayside, went there first, and tended to stay there.

All in all, the show was a success for most exhibitors, but it was not as successful as it should have been. If the show had been held in one, easy-to-get-to, comfortable, and well-known "venue," I think we would have seen the most exciting convention ever.

Does this mean that the show must leave Boston? I don't know. At least one hotel executive told me that Boston's entire hotel industry was a bit "surprised" that the Boston Hynes Convention Center was not chosen, as the entire show likely would have fit there.

But whether the next show is held in Boston or not, it must be held in a place that can handle it. The prices are too high to exhibitors not to offer them the best of all places to show their wares; convention goers deserve better than they have so far received in Boston.

If Boston cannot handle it via the Hynes route, certainly many cities on the East Coast would make far better sites than we saw in Boston this year. Atlanta, New York, and Washington, DC, all come to mind.

And, while I am on the subject of computer shows, there are a few other issues that I think need to be aired.

BOSTON OR BUST?

For one thing, how many computer shows can one field possibly support? The way I count it, in 1989 anywhere from four to six major shows are scheduled. There is a show scheduled in Washington, DC, (hmmmm, we'll have to examine the venue) just weeks before the show in Boston. C'mon guys. The entire field of consumer electronics has only two shows (the huge CES conventions) a year. I'm as excited about the Macintosh as the next guy. In fact I'm probably as excited as the next guy about the Mac even if I'm seated next to Jean-Louis Gassée.

But excitement can carry you only so far. I feel very bad for the many exhibitors this year who will have no real idea where to put their money and show their products. I also feel for the consumer wondering which show will be "the one."

Obviously, as long as people make money at new shows, there will be new shows. But I worry that the first "bust" show could rebound against the whole field.

As the shows get bigger and the companies involved get larger, this problem of too many shows will become more and more apparent. As a person who has been involved on setup day with major exhibitors, I'm always amazed to see what goes on behind the scenes to get a show such as the Boston one ready for the opening bell.

It is little short of miraculous to walk into one of these empty halls. You first stare across blank floors to walls that look as if they are so far away that the earth's curvature should be visible. Then you realize that in a few hours of extremely bustling activity, that empty floor will be filled with Lucite, fabric, metal, glass, Macintoshes, and a sea of human beings.

Ask anyone who has ever set up such a booth and then called it home for three or four days how many shows a year they feel like going to. Sooner or later, some of these major companies are going to look at how much these shows cost in both time and money, and they'll perform a bit of triage.

The Macintosh conventions are wonderful times for those of us interested in the Macintosh and in meeting others with that interest. But as the Macintosh community grows, the shows themselves will have to change to reflect this.

Here's hoping they change for the better!



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💣	DOESN'T WORK

H A R D W A R E

AppleCD SC Drive

As with most of their products, the release of Apple's compact-disc optical ROM drive was accompanied by much ballyhoo, including a technical conference in Seattle coinciding with Microsoft's CD-ROM conference. Apple's track record in external drives for other media hasn't been too good — its DC2000 .25-inch tape backup and 5.25-inch DOS-compatible drives never received good reviews. But unlike its other entries, the AppleCD SC is a well-thought-out product for those who can use it.

The main benefit of CD-ROMs is that they hold a lot of data: The CD SC reads optical discs holding as much as 656 megabytes. But CD-ROM is not for everyone. Like a microfiche unit, you can only read data from it, not write to it. In fact, much of the data currently going onto CD-ROM is very much like that on microfiche — archival data and periodic service information. But because of the massive storage capability, the AppleCD SC is also good for storing color animation and music.

Don't expect a CD-ROM player to perform as a hard-disk drive. In fact, I found it slower than a diskette drive. The access time for the CD SC and most other CD-ROM drives is about 130 milliseconds, almost ten times slower than a fast hard-disk drive.

Apple claims the unit works with any Mac or Apple II equipped with a SCSI port. I tried it on a Mac II and a Plus with no major problems. Shaped to fit under a Mac SE or Plus, the CD SC is a SCSI device with a pin-poke-type switch on the rear panel to change the SCSI address. The front panel has two indicator lights for power and disk access.

The CD SC reads three CD-ROM formats: the Mac's standard HFS; ProDOS for Apple IIs; and High Sierra format, an industry standard that works with different operating systems including DOS and the Mac OS. The latter is important, enabling you to share your High Sierra discs among most of the computers in your office. (You may need a separate application to access information on High Sierra discs. See "Optical Horizons," June '88.)

Operation is similar to that of a diskette drive, where inserting a disk causes the icon to appear and trashing the icon ejects the disk. Unlike audio compact-disc players, into which you directly place CDs, a CD-ROM must be placed in a cartridge called a *caddy* before it is inserted into the drive. This is a holdover from the first optical-disc systems designed for large computers, which used fragile discs made of glass. Caddies for CD-ROMs are a nuisance and largely unnecessary, because today's CD-ROMs are made of tough, flexible plastic that can take fingerprints, dust, and even light scratches without affecting performance or losing information.

One side benefit is that the CD SC also plays audio compact discs. I am listening to Fritz Reiner play Bartók as I write this review. Stereo output jacks

AppleCD SC Optical-Disc Player Timing Test

	AppleCD SC CD-ROM	Mac II 40-Mb hard-disk drive	Mac II 3.5-inch–disk drive
Icon appears after disc inserted (with disc window open)	8.63	N/A	6.28
Opens 6-Mb color image/music application	7.29	3.56	N/A
Opens 53K Adobe Illustrator file*	12.63	9.47	11.21
Opens 12K Word file*	7.97	5.80	7.16

All times in seconds.

*Adobe Illustrator and Microsoft Word applications were located on hard disk.



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Expressionist 2.0 *(equation editor)* ..... 79.
Borland
Sidekick 2.0 ..... 65.
Exodus Software
Retriever ..... 55.
Greene
QuickDEX ..... 32.
Solutions
SmartScrap & The Clipper ..... 35.
TENpointO
Open IT! ..... 49.

LANGUAGES

Borland
Turbo Pascal ..... 65.
Turbo Database Mac ..... 66.



GOfer™ (Microlytics) — The new high speed text-retrieval accessory from Microlytics. Summon GOfer™ with one keystroke to search out information in your disk files. Enter one or two words and have a document at your fingertips within seconds! Works with almost any file. *(utilities)* **$45.**

Consulair
68000 Development System ..... 59.
Manx Software Systems
Aztec C ..... 75.
Aztec C+SDB ..... 115.
Microsoft
Basic Interpreter 3.0 ..... 62.
QuickBasic ..... 69.
SmethersBarnes
Prototyper ..... 74.
Symantec
CAPP's Lightspeed C or Pascal ..... 49.
Lightspeed C 3.0 ..... 95.
Lightspeed Pascal ..... 65.



Macinware™ SE Extended Carry Case (MacLuggage™ by I/O Design, Inc.) — Protect your Mac and its peripherals with I/O Design's line of heavy-duty lightweight carrying cases. Constructed of 1000 Denure Cordura™ nylon with 2" webbing reinforcement. Padded throughout for maximum equipment protection, these cases handle a range of accessories. *(accessories)* **$79.**

Talking Tiles (Bright Star) — Bright Star brings computer-aided learning to life with an interactive, animated talking tutor complete with real speech sounds synchronized with correct facial movements. With Talking Tiles, you'll see and hear how letter sounds are combined to form words using fun and educationally sound teaching methods. *(education)* **$75.**



Zedcor
ZBasic 5.0 ..... 99.

COMMUNICATIONS

CE Software
QuickMail ..... 175.
CompuServe
CompuServe Navigator ..... 45.
Computer Applications
II In A Mac ..... 109.
DataVIZ
MacLink Plus w/Cable ..... 145.
Dow Jones
Desktop Express ..... 95.
FreeSoft
Red Ryder 10.3 ..... 55.
Hayes
Smartcom II *(communications)* ..... 88.
Peripherals Computers & Supplies
Versa Term Pro ..... 199.
Software Ventures
Microphone II ..... 225.
SuperMac
Acknowledge ..... 349.
Traveling Software
LAP-LINK ..... 85.

Full Impact
This hot new high-powered spreadsheet from Ashton-Tate offers full charting capabilities, extended text formatting options, and imports data in a variety of formats. *(business)* **$249.**

Lightspeed C 3.0
Create programs in record time with Symantec's exceptionally fast compiler, linker, integrated multi-window text editor, auto-make facility, and powerful source-level debugger. *(language)* **$95.**

PixelPaint (SuperMac) — A powerful color graphics program designed specifically for the Mac II to create and enhance color and grey-scale images. It lets you select from 16.8 million colors and create custom palettes of up to 256 colors at a time. Puts the power of color at your fingertips to give your work the stunning visual impact you want. *(graphics)* **$209.**



FREE OFFER



The MacWarehouse technical staff and the publishers of the popular Power User's Manual have put together a great new disk of utilities, desk accessories and applications. THE POWER USER'S TOOL KIT. You'll find yourself coming back to these handy programs again and again. There's even a powerful word processor you can install as a desk accessory.



And here's the best part. The Power User's Tool Kit is free with any purchase from MacWarehouse. You pay only $3.50 for shipping and handling (if you want the disk). The programs are shareware, so you can try the software free of charge. If you wish to continue, some authors ask that you send them a small fee ($5 - $25). Some of the programs are absolutely free. All of the details are explained on the disk, which is yours to keep anyway.

FREE CATALOG

But that's not all. You'll also receive the brand new MacWarehouse catalog. We've added hundreds of new products and updated all the information from our previous catalogs to bring you the latest answers to your questions about compatibility, copy protection, and features. The catalog will be included with your order, or you can mail us the coupon below for your free copy.

Take a look at the MacWarehouse specials and call us with your order to receive your free catalog and THE POWER USER'S TOOL KIT.



DTP Advisor (Broderbund) — This ultimate training and scheduling tool is both a graphic arts tutor and a great project management system. Designed as a HyperCard application that shows you how to get fast professional desktop publishing results. *(desktop publishing)* **$49.**

New 800K Drive (Cutting Edge) — The Cutting Edge 800K disk drive's attractive styling, quiet performance, and high-tech reliability make it the most popular floppy drive on the market. The drive uses ASIC technology to reduce the number of parts, increasing reliability and reducing weight. The drive features an LED light which indicates disk access. A hinged door, covering the disk insertion slot, keeps the mechanism clean and makes periodic cleaning and maintenance unnecessary. The drive uses standard Apple formatting routines and supports the Macintosh's standard software eject features but provides its own manual eject mechanism as well.One year warranty *(disk drives)* **$175.**



PowerPoint 2.0 (Microsoft) — Presentation graphics for power users. PowerPoint generates a wide variety of graphics, keeps them organized, and provides a consistent style for each presentation. You can create 35mm slides, overhead transparencies, flipcharts, audience handouts, and even your own notes. PowerPoint gets your point across with style and polish. *(business)* **$249.**



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Thunderscan 4.0
Converts your ImageWriter into a scanner with special effects such as rotation, linescreens, captions, and frames of various sizes. It is packaged complete for Mac 512K, 512KE, Plus, and SE. *(input/output)* **$199.**

Acknowledge
Bring power, automation, and speed to telecommunications with the Macintosh communications solution from SuperMac. Puts a Macintosh interface on all communications, including remote services and mainframes. *(communications)* **$349.**

Illustrator 88
A professional-level graphics program that contains unique and powerful drawing techniques — autotrace, airbrushing, shading, masking, blending, color separations, and printing. *(desktop publishing)* **$319.**



Wedge XL 45 Plus
Cutting Edge's 45MB compact wedge-shape hard disk drive. Plugs directly into your Mac's SCSI port and is preformatted for immediate use. Extra quiet fan with excellent cooling capabilities. *(disk drives)* **$829.**

Management Graphics
Easy Slider 1.0 ..... 105.
Microllusions
Photon Paint ..... 179.
MicroMaps
MacAtlas Pro *(MacDraw format)* ..... 129.
Olduvai
Post-Art II ..... Call.
Silicon Beach
Digital Darkroom or Super 3D ..... ea 159.
SuperPaint 1.1 ..... 79.
Solutions
Curator *(graphics management)* ..... 79.
SuperMac
PixelPaint ..... 209.
Symmetry
PictureBase 1.2 ..... 58.
T/Maker
ClickArt Business or Publications ..... 28.
ClickArt EPS Illustrations ..... 75.
Zedcor
DeskPaint 2.0 ..... 69.

DESKTOP PUBLISHING PRODUCTS

Adobe
Illustrator 88 ..... 319.

HyperTools #1 & #2 (Softworks) — Give stacks the one-two punch. HyperTools #1 is for creating stacks, creating scripts automatically and extending the capabilities of HyperCard. HyperTools #2 adds versatility to personal and commercial stackware for data entry, visual presentation of data, and field formatting. Each includes 16 tools and the latest version of HyperCard. *(hyperware)* **$65. each**





Aztec C (Manx Software) — Includes Aztec Shell, Compiler, 68000 Macro Assembler, Overlay Linker, Librarian, Run Time Libraries, Profiler, Full Macintosh Toolbox Interface, and Portable C Library Interface. *(language)* **$75.**

Aldus
PageMaker 3.0 ..... 399.
Broderbund
DTP Advisor ..... 49.
Letraset
Image Studio or Ready,Set,Go! 4 .. 279.
ReadySetShow ..... 189.
Olduvai
Read-It! 2.0 *(OCR)* ..... 199.
Springboard
Springboard Publisher ..... 114.
Target
Scoop ..... SPECIAL 189.

NETWORKING PRODUCTS

Connect Inc.
MacNet ..... 43.
Farallon
PhoneNET ..... Call
Timbuktu 2.0.1 ..... 61.
Nuvotech
TurboNET ..... ea 27.
SuperMac
Network DiskFit ..... 199.
TOPS
TOPS 2.0 ..... 159.

FONTS

Adobe
Fonts *(various volumes)* ..... Call.
Altsys
Fontastic Plus 2.0 ..... 54.
Olduvai
Art-Fonts ..... 59.
Postcraft
Laser FX ..... 115.

CAD/CAM

Graphsoft
MiniCad 4.0 ..... 375.
Innovative Data
MacDraft 1.2a *(power drafting)* ..... 155.
Dreams ..... 318.
Micro CAD/CAM
MGMStation *(professional CAD)* ..... Call.

FINANCIAL AND ACCOUNTING SOFTWARE

Aatrix
Payroll 3.01 ..... 99.
Bedford
Simply Accounting ..... 219.
Chang
Rags to Riches 3 Pak ..... 289.
Intuit
Quicken ..... 35.
MECA
Managing Your Money ..... 129.
Monogram
Business Sense ..... 279.
Dollars & Sense ..... 81.
ShopKeeper Software
Bill-It 1.06 ..... 99.
Softview
MacInTax ..... Call.
TaxView Planner ..... 49.
Survivor
MacMoney 3.02 ..... 62.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II *(req. Mac II, or Plus/SE w/68881 co-processor)* ..... 369.
StatView SE+Graphics ..... 230.
BrainPower
StatView 512+ *(requires 512k)* ..... 175.
D2 Software
MacSpin 2.0 ..... 155.
Odesta
Data Desk Professional ..... 295.
Select Micro Systems, Inc.
Exstatix ..... 219.

MUSIC AND SOUND

Coda
MacDrums ..... 35.
Electronic Arts
Deluxe Music Construction 2.0 ..... 61.
Farallon Computing
MacRecorder *(records sound)* ..... 145.
Great Wave
ConcertWare + MIDI 4.0 ..... 79.
Impulse
Impulse Audio Digitizer w/SoundWave ..... 149.

Icon-It! (Olduvai) — Think of Icon-It! as "HyperCard-like" buttons for any application that lets you customize your work environment. Select menu items, DAs, fonts, FKEYs, and even macros from one of Icon-It!'s custom-designed icons. Over 65 predesigned icon bars are included, or you can create your own with the built-in editor. *(utilities)* **$40.**



MORE FOR YOUR MONEY...

DATABASE SOFTWARE

Acius
4th Dimension ..... 489.
Ashton-Tate
dBase Mac ..... 295.
Borland
Reflex Plus ..... 165.
Claris
FileMaker II ..... 239.
Fox Software
FoxBASE+/Mac ..... 209.
Odesta
Double Helix II ..... 339.
GeoQuery ..... 299.
Park Row Incorporated
Publish or Perish ..... 21.
Personal Bibliographic
Pro-Cite ..... 199.
Software Discoveries
Record Holder Plus ..... 45.

BUSINESS SOFTWARE

Ashton-Tate
Full Impact ..... 249.
Bravo
MacCalc ..... 79.
BreakThrough Productions
Market Master ..... 185.
Claris
MacProject II ..... 395.



QuickMail™ (CE Software, Inc.) — This is revolutionary. Not only better on Local Area Networks, but accesses Wide Area services (CompuServe, MCI Mail, INET, GEnie, etc.), other operating systems (A/UX, etc.) and from remote locations. *(communications)* **$175.**

Cognition Technology
MacSMARTS 3.02 ..... 135.
Cricket
Cricket Graph *(advanced graphing)* 119.
Cricket Presents ..... 289.
MicroPlanning International
MicroPlanner Plus ..... 445.
Microsoft
Excel 1.5 ..... 249.
PowerPoint 2.0 ..... Call.
Works 1.1 *(integrated software)* ..... 189.
nView Corporation
MacViewFrame ..... 1299.
North Edge Software
Timeslips III *(time/expense tracking)* 119.
Satori
Bulk Mailer 3.2 ..... 79.
Select Micro Systems
FlowMaster ..... 369.
Shana Enterprises
FastForms! Construction Kit ..... 89.
Softview
FormSet ..... 59.
MacInUse ..... 42.
Symantec
More II ..... Call.



HyperAnimator (Bright Star) — Add life to your HyperCard stacks using animated images synchronized with sound. A breakthrough in animation technology — HyperAnimator lets you create life-like talking images on screen. Combine the spirit of animation with the power of the Mac... for fun, entertainment, education, and desktop presentations. *(hyperware)* **$85.**

WORD PROCESSORS AND OUTLINERS

Ashton-Tate
FullWrite Professional ..... 269.
Claris
MacWrite 5.0 ..... 105.
Microsoft
Word 4 *(updated word processor)* ..... 249.
Write 1.0 *(new word processor)* ..... 113.
Niles & Associates
End Note ..... 85.
Paragon
Qued/M ..... 109.
Symmetry
Acta Advantage w/DA ..... 65.
T/Maker
WriteNow 2.0 *(word processor)* ..... 109.
WordPerfect Corp.
WordPerfect ..... 185.

SPELLING CHECKERS

Aegis
Doug Clapp's Word Tools ..... 42.
A.L.P.
MacProof 3.0 ..... 115.
Deneba Software
Spelling Coach 3.0 ..... 54.
Spelling Coach Pro ..... 109.
Electronic Arts
Thunder *(spelling checker)* ..... 30.
Microlytics
Word Finder *(synonym finder)* ..... 35.
Sensible Software
Sensible Grammar ..... 55.
Working Software
Spellswell 2.0 *(spelling checker)* ..... 45.

GRAPHICS

3G Graphics
Images w/Impact
Graphics & Symbols 1 ..... 59.
New Business Clip Art ..... 65.
Aba Software
Draw It Again Sam 2.0 ..... 79.
GraphistPaint (B&W) ..... Call.
GraphistPaint II ..... 375.
Aldus
Freehand ..... 349.
Broderbund
Drawing Table ..... 79.
PosterMaker Plus ..... 38.
Print Shop *(cards and more)* ..... 36.
VideoWorks II ..... 175.
CE Software
CalendarMaker ..... 28.
Claris
MacDraw II 2.0 ..... 329.
MacPaint 2.0 ..... 105.
Cricket
Cricket Draw ..... 169.
Cricket Paint ..... 99.
Pict-O-Graph *(color on the Mac II)* .. 105.
Deneba
Canvas 2.0 ..... 169.
Dream Maker
Cliptures, Vol. 1 Business Images ..... 97.
MacGallery ..... 29.
Dubl-Click
Wet Paint - Both Volumes ..... 45.
Electronic Arts
Studio/8 ..... 319.

WriteNow 2.0
This fast, powerful, easy to learn word processor includes 100,000 word spelling dictionary, mail merge, 4 editable columns on a page, and instant repagination. *(word processor)* **$109.**

SuperPaint 1.1
This high-powered paint program features three levels of magnification, lets you edit images at 300 dots per inch for incredible detail, and gives the ability to draw shapes larger than your screen. *(graphics)* **$79.**



Suitcase 2.0
Packed with power, control, and flexibility — this font and desk accessory removes limitations on the number of fonts or DA's you can have. *(utilities)* **$44.**

Symantec Utilities for Macintosh
A set of six utility programs... from crashed disk and deleted file recovery to hard disk partitioning and optimization. Easy to use with powerful protection for your valuable data. *(utilities)* **$59.**

Red Ryder 10.3
One of the most powerful and flexible telecommunications programs available for the Mac. Supports full text selection and Clipboard and works with nearly every file transfer mode known. *(communications)* **$55.**

MacMoney 3.02
This versatile, powerful and intuitive accounting package from Survivor Software is a full double-entry personal bookkeeping system and financial planning tool. Integrates with MacInTax. *(finance)* **$62.**

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OVERNIGHT ... ONLY $3.00



On Cue (Icom Simulations) — An easy-to-use utility that lets you move from one program to another — instantly! Now with a single click of the mouse, you can go from application to application, from document to document. Lets you work smoothly, quickly, and efficiently. *(utilities)* **$36.**

Opcode Systems
Music Mouse ..... 39.
Passport Designs
Master Tracks Pro ..... 259.
NoteWriter ..... 169.

EDUCATIONAL/ PERSONAL

Bright Star Technology
Alphabet Blocks ..... 32.
Talking Tiles ..... 75.
Broderbund
Calculus ..... 60.
Davidson
Math Blaster ..... 27.
Speed Reader II ..... 39.
Great Wave
Kids Time ..... 26.
Learning Company
Reader Rabbit ..... 33.
Mindscape
Perfect Score S.A.T. ..... 46.
Palantir
MacType ..... 31.

QuicKeys™ (CE Software, Inc.) — In seconds, you can designate keystrokes to save hours doing routine tasks. MacUser's "Eddy" award–Five Mouse Rating–New York Mac Users Group "Product of the Year"–MacGuide "Golden Gavel" award. "QuicKeys is right up there with sliced bread, the Great Pyramids of Cheops, and other wonders"–Byte Magazine. *(utilities)* **$54.**



Simon & Schuster
Typing Tutor IV ..... 35.

GAMES

Activision
Shanghai *(strategy)* ..... 24.
Artworx
BRIDGE 5.0 ..... 22.
GrailQuest xx
Broderbund
Ancient Art of War At Sea ..... 27.
Shuffilepuck Cafe ..... 22.
Where in the World is Carmen San Diego ..... 25.
Bullseye
Ferrari Grand Prix *(racing)* ..... 32.
P51 Mustang ..... 32.
Centron Software, Inc.
BlackJack Ace ..... 27.
Crapsmaster or Roulette ..... 27.
Ciasa
Handwriting Analyst ..... 29.
Electronic Arts
Chessmaster 2000 *(deluxe chess)* ..... 29.
Patton vs. Rommel *(strategy)* ..... 15.
Scrabble ..... 27.
Starfleet I: The War Begins ..... 37.
Chuck Yeager Adv. Flight Trainer ..... 32.
Epyx
Sub Battle Simulator ..... 24.
Greene
Crystal Quest II ..... 27.
Infocom
Leather Goddess of Phobos ..... 24.
Micro Sports
MSFL Pro League Football ..... 32.
Mindscape
Balance of Power, Deja Vu - ..... ea 30.
Shadowgate, Uninvited - ..... ea 30.
PBI
Strategic Conquest Plus ..... 46.
PCAI
Road Racer ..... Call.
Practical Computer
MacCourses ..... 32.
MacGolf 2.0, MacRacquetball - ... ea 35.
Primera
Smash Hit Racquetball II ..... 22.
Sierra On-Line
Leisure Suit Larry ..... 23.
Silicon Beach
Apache Strike, Dark Castle - ..... ea 27.
Beyond Dark Castle ..... 27.
Simon & Schuster
Star Trek:Kobayashi Alternative ..... 24.
Spectrum HoloByte
Falcon, Gato - ..... ea 26.
PT109 ..... 26.
Solitare Royale ..... 20.
Tetris ..... 23.

DISK DRIVES/ MEMORY UPGRADES

1 MEG SIMMS ..... Call.
AST
Mac286 Co-Processor *(Mac II)* ..... 1079.
CMS
CMS TapeStack 60 Meg ..... Call.
MacStack 20 Meg ..... 569.
MacStack 40 Meg ..... 789.
MacStack 60 Meg ..... 849.
Cutting Edge
800K Disk Drive "NEW" ..... 175.
Wedge XL 30 Plus ..... 629.
Wedge XL 45 Plus ..... 829.
XL 30 Internal ..... 505.
XL 45 Internal ..... 645.
Dayna Communications
DaynaFile single 360K *(5 1/4")* ..... 529.
Dove
MacSnap 2SE ..... 455.
MacSnap SCSI Interface Port ..... 129.
MacSnap 524 *(512k to 1 meg)* ..... 299.



MacSnap 548S (Dove) — This quality upgrade expands a 512K Mac (if it has the new 128K ROMs) to two megabytes. Includes SCSI interface and external SCSI plug. Easy installation. *(disk drives)* **$599.**

MacSnap 524S ..... 379.
MacSnap 548 *(512k to 2 meg)* ..... 559.
MacSnap 548S ..... 599.
MacSnap Plus 2 ..... 439.
MacSnap 1024
Memory Expansion Board ..... Call.
MaraThon 020 Accelerator ..... 585.
Everex
EMAC 20D *(hard drive)* ..... 520.
EMAC 20D Deluxe *(0 footprint)* ..... 585.
EMAC 40D Deluxe *(0 footprint)* ..... 995.
EMAC 60T *(tape backup)* ..... 895.
EMAC FS-102 ..... 2495.
Impact 40 MB Hard Drive ..... Call.
Impact 66 MB Hard Drive ..... 999.
PCPC
MacBottom HD21 (SCSI) ..... Call for
MacBottom HD32 (SCSI) ..... special
MacBottom HD45 (SCSI) ..... 859.
MacBottom HD21 w/Modem ..... 779.

Works 1.1
Offers a solid, easy-to-use selection of standard "flat file" manager functions while integrating the most-needed office applications: spreadsheet, database, word processor, and terminal software. *(business)* **$189.**



Microsoft Excel 1.5
Customize your needs with this powerful and popular spreadsheet, business graphics, and database program. Includes 44 additional new worksheet functions. *(business)* **$249.**

TOPS 2.0
This versatile server software networks computers with different operating systems, and you can access it any time, from any application. Supports Macs, MS-DOS compatibles, and UNIX. *(networking)* **$159.**

EMAC 20D
From Everex — this fast, reliable, and portable 20 MB hard disk drive comes complete with SCSI interface, cables, terminator, and full one year manufacturer's warranty. *(disk drives)* **$520.**



BlackJack Ace (Centron) — Become a Master of BlackJack! Teaches card counting and the basic/advanced strategies needed to give you the skill and knowledge to practically eliminate the house advantage. *(entertainment)* **$27.**

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MSFL: Pro League Football
Professional football league simulation puts you in the middle of the "real" action... including all aspects from weather conditions to the coin toss. Features 42 past Super Bowl teams and Stats Keeper 1.0. *(entertainment)* **$32.**

Word 4.0
Microsoft's latest version of the best-selling document processing program. Complete WYSIWYG editing; powerful customizing features; enhanced tables support; automatic repagination; and two-way file compatibility. *(word processors)* **$249.**



NEW Turbo Mouse
Retire your mouse and replace it with the new Turbo Mouse from Kensington. With the mouse ball on top, it's quicker, quieter, and easier to use. Advanced button features include a Click Lock. *(input/output)* **$109.**

Dark Castle
Outstanding action game integrates RealSound with superb animation and spectacular graphics. Four levels of play that are challenging, and addictive. *(entertainment)* **$27.**

FoxBASE+/Mac
This Macintosh database system lets you create custom icons, user-defined buttons, and multiple windows. Contains proper Mac interface -compatible with Ashton-Tate's dBASE Mac. *(database)* **$209.**

MacBottom HD32 w/Modem ..... 829.
MacBottom HD45 w/Modem ..... 1029.
WSI *(With SCSI Interface)* ..... 269.
Peripheral Land, Inc.
Infinity Turbo 40 Meg ..... 1299.
PL 30 Meg Turbo Drive ..... 819.
PL 50 Meg Turbo Drive ..... 919.



Fanny Mac QT (Mobius Products) — Safe, effective cooling for your Mac with low-profile, ultra-quiet fan. Reduces internal operating temperatures. Includes built-in surge protector. *(accessories)* **$65.**

MODEMS

Abaton
InterFax 12/48 ..... Call.
Best Data Products
SmartOne 2400/1200 ..... 169.
Everex
EMAC 2400 ..... 225.
Hayes
Smartmodem 1200 ..... 299.
Smartmodem 2400 ..... 449.
Smartmodem 9600 *(V series)* ..... 985.
Migent
Pocket Modem *(ext. 300/1200 baud)* 115.
Prometheus
Promodem 2400 ..... 309.
Shiva
NetModem 1200 ..... 359.
Supra
Supra Modem 2400 ..... 149.
US Robotics
Courier 1200 Modem ..... 199.
Courier 2400 Modem ..... 349.

BLANK MEDIA

B.A.S.F.
DS/DD (box of 10) ..... 16.
Goldstar
DS/DD *(box of 10)* ..... 15.
Sony
DS/DD *(box of 10)* ..... 18.
SS/DD *(box of 10)* ..... 13.

INPUT/OUTPUT

Abaton
ProPoint ..... 89.
Asher Engineering
Turbo Trackball *(512/Plus or SE/II)* ..... 69.
Cutting Edge
CE-105 ADB Keyboard ..... 125.
DataDesk
Mac 101 Keyboard ..... 139.
Kensington
New Turbo Mouse ..... 109.
Koala
MacVision *(digitizer)* ..... Call.
Mouse Systems
A+ Mouse *(512, Plus)* ..... 65.
A+ Mouse ADB *(SE, II)* ..... 85.
New Image
MacScan *(feed-thru)* ..... 1189.
MacScan *(flatbed)* ..... 1749.
Seikosha America
Seikosha Printer *(dot-matrix)* ..... 238.
Summagraphics
Bit Pad Plus ..... 335.



ArchiText™ (Brainpower) — An exceptionally versatile text retrieval, management, and presentation package that combines Boolean searching and Hypertext abilities. Incorporates a separate read-only application for free viewer distribution. *(hyperware)* **$182.**

ThunderWare
ThunderScan 4.0 *(incl. Powerport)* 199.

ACCESSORIES

Computer Friends, Inc.
MacInker/Black Ink ..... 3.
MacInker *(IW & IW II)* ..... 41.
Ergotron
MacTilt or MacTilt SE ..... 68.



New Business Clip Art (3G Graphics) — Create professional publications and presentations with over 150 sharp, contemporary PostScript images. Contains computers, occupational and public symbols, icons, people, hands, communication, aerospace, money, business phrases, transportation, and more! *(graphics)* **$65.**

Mouse Cleaner 360 ..... 15.
The Muzzle *(for the SE)* ..... 62.
I/O Designs
ImageWare II Carrying Case ..... 49.
ImageWriter LQ Ribbon ..... Call.
IW II Ribbons-Black or Color ..... 5.
Macinware Plus Carrying Case ..... 69.
Macinware SE Carrying Case ..... 79.
Ribbon for Seikosha – Black ..... 6.
Kalmar
Rolltop Cabinets
(45, 90, or 135 disks) ..... Call.
Kensington
Anti-Glare Filter ..... 33.
Apple Security Kit ..... 34.
Disk Drive Cleaning Kit ..... 20.
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Quick Clicks



Apple's CD Remote desk accessory is difficult to read on-screen, but it lets you program and replay tracks on its CD SC optical-disc drive. The drive reads discs containing up to 656 megabytes of information and plays regular audio CDs as well.

AppleCD SC

List Price: $1,295
Manufactured by: Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014; (408) 996-1010.
Requires: Macintosh or Apple II with SCSI port (any RAM configuration).
Compatibility: Mac II and MultiFinder friendly.

on the back panel can plug into any amplifier. The front panel has a headphone jack and a volume control. A desk accessory called CD Remote is included that has all the common control functions of a CD player. You can also program and save the sequence of tracks. The CD SC makes an expensive CD audio player, but it is a nice feature for music lovers and those doing presentations with CD-ROMs.

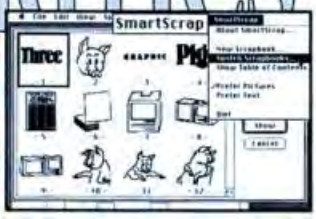
With databases, color graphics, HyperCard stacks, and animation demanding ever-increasing amounts of storage space, an optical disc on a Macintosh is a good idea. If you've decided a CD-ROM drive will fit your needs, Apple's drive is a good unit. The CD SC's main drawbacks — slow access speed and no write capabilities — are aspects of the technology and therefore of all CD-ROM drives. A big boost to the CD SC's usefulness will occur when Apple releases its promised AppleShare upgrade that will allow network access to the CD-ROM player.

Although the AppleCD SC is priced much lower than a 650-megabyte hard-disk drive would be, I do think the cost could be lowered to make it a more worthwhile investment for most users. — *John Rizzo*

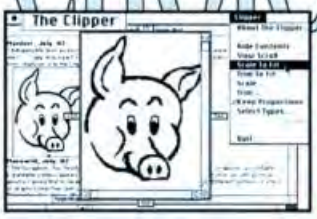
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MacWorld, August 1988

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The DEST PC Scan 2000 brings 8-bit-scanner technology to the desktop. Coupled with Publish Pac software, the scanner can digitize images in up to 256 shades of gray. An optional OCR board lets you convert typed text into a word-processing file.

HARDWARE

DEST PC Scan 2000

A scanner on your desktop is like having a digital Cuisinart for your computer. Especially one like the DEST PC Scan 2000 that can funnel both images and words from the outside world into documents that you can cut, paste, and process. This is a high-end scanner that supports up to 256 levels of gray. I have found its fine control of detail and quality a good conduit for material to be used in gray-scale image-processing programs like ImageStudio and Digital Darkroom.

The PC Scan 2000 is an 8-bit scanner with a maximum resolution of 300 dpi, accessed from three image-scanning modes. The Drawing, or bilevel, mode is best for converting line art such as drawings or maps. The Gray-scale mode can sense and reproduce up to 256 levels of gray; this mode is best for converting photographs. The Halftone mode can take photos and shaded art and convert them into four different halftone patterns to simulate gray. This can be useful in preparing art for mechanical reproduction.

Electronic scaling of the image before scanning — choosing only the area of the original you really need — is clear and easy with DEST's Publish Pac scanning software. There, you can choose to scan in resolutions of 200, 240, and 300 dpi and adjust the scanning brightness. There is a Preview option in the scanning area window to let you see before you save. You can save in six image document formats: TIFF, TIFF compressed, SuperPaint, MacPaint, PageMaker 1.2, and Encapsulated PostScript Format (EPSF). The scanning window provides a basic tool palette, enabling you to frame and clean up the scanned image. DEST bundles a copy of SuperPaint as part of the package, so you can creatively manipulate the captured image.

With the addition of the Text Processor card, the PC Scan 2000 becomes an optical character reader (OCR). Once considered exotic only a couple of years ago, OCRs provide a tremendous boost to productivity in an office environment, saving countless hours of manual keyboarding time. A single command starts the text-scanning process, and within 10 to 15 seconds, the word is in. DEST's OCR can deal only with straight-text documents and favors fonts like Courier, Prestige, and Letter Gothic. The document can be saved in MacWrite, Microsoft Word 3.0, or as unformatted text. Characters that were rejected will be marked by a pound sign (#) in your electronic document for correction. An alternate character can be assigned.

The major disadvantage of a sheet-fed scanner like this is that all material to be scanned must be no heavier than 30-pound bond and no lighter than 16-pound bond paper. This prevents you from direct-scanning many original photos and documents, as well as thin-tracing paper drawings that could get caught in the rollers. The alternative is to make a high-quality photocopy of the original to travel through the scanner. Some users regard the photocopy as a useful first stage in the digitizing process, while others feel that intrinsic subtleties in the original are lost.

Because this sheet-fed model is front-loading — like a disk drive — you can stack this 4-x-16-x-11-inch unit under your Plus, SE, Mac II monitor, or ImageWriter. This is an advantage over most flatbeds, which are top-loading. While the PC Scan 2000 is of excellent quality and workmanship, it does not afford easy access to the paper feed-path in case of malfunctions. Also, you are unable to scan illustrations in bound books without making a photocopy. The scanner can accept sheets as large as 8.5 x 14 inches and as small as 4 x 5 inches. An automatic document feeder (ADF) accessory is also available.

The DEST PC Scan 2000 is in many ways a real bargain. You get an 8-bit scanner at a relatively cheap price. The OCR is quite capable for typed text. Furthermore, the PC Scan 2000 can also hook up to an IBM PC with only the flip of a switch and a new cable. If you need 256 grays and can live without the advantages of a top-loading flatbed, then the PC Scan 2000 may be your best bet. — *Tony Reveaux*

DEST PC Scan 2000
★★★★½



List Price: Scanner, $1,495; DEST Publish Pac for the Macintosh, version 2.10, $595; Text Processor card, $995.
Manufactured by: DEST Corporation, 1201 Cadillac Court, Milpitas, CA 95035; (408) 946-7100, (800) 538-7582.
Requires: 1M
Compatibility: Mac II and MultiFinder friendly. Can be configured for IBM PCs.
Copy Protection: None



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Quick Clicks



FileMaker II is a multiuser version of the all-time best flat file manager for the Macintosh. This revision is as easy to use as the older FileMaker Plus and sports many new features, including more flexible layouts, hierarchical menus, and color on the Mac II.

DATABASES

FileMaker II

Sometimes more is less and less is better. In the case of databases this is definitely true for the majority of Mac users who just need to maintain a mailing list or perform some other simple form of data management. Running off mailing labels with a relational database is like sweeping your floor with a steam shovel or playing ticktacktoe on a Cray. FileMaker Plus (the previous version of this program) has been the flat file manager of choice on the Mac. FileMaker II consolidates this position. (FileMaker II was briefly known as FileMaker 4 when it was marketed by Nashoba. Claris acquired the product and changed the name but not the software.)

Working with FileMaker II is a pleasure. Most users familiar with the Mac interface will forego the excellent manual and be comfortable with the program in only a few minutes. Like PageMaker or PixelPaint — though not as spectacular or sexy — FileMaker II doesn't just use the Mac interface but seems to live and breathe it, making previously tedious tasks seem almost fun.

Setting up a file is extremely easy and intuitive. After clicking New and naming the file, you define your fields in a remarkably simple fashion. You can then either enter data using the default layout or design your own layout(s). Designing sophisticated layouts is a breeze with the drawing tools and type options. In older versions of the program, it was difficult to align objects in a layout. The programmers apparently listen to users, because FileMaker II includes an invisible-grid feature that eliminates this problem. You can also import pictures as a standard part of your layout via the Mac's Clipboard.

Flexibility is not sacrificed for simplicity. Since a file can have any number of different layouts, it is possible to view data from many different perspectives. A membership file for a user group, for instance, could serve as the basis for producing mailing labels, a user directory, dues notices, and so on. Exporting data for a mail merge is a straightforward task.

Besides the invisible grid, a number of new features have been added to FileMaker II. Business users should be especially pleased with the program's new networking capabilities. It is possible for multiple users to work independently on a file. Although using a file server such as TOPS in conjunction with FileMaker II allows for greater capabilities, limited file sharing is possible with only a hardware AppleTalk network. A number of features — such as passwords, confidential layouts, exclusive rights, and multiple access levels — ensure the integrity and security of your files.

The program has been overhauled and fine-tuned in other areas, too. Among the most important refinements are a more powerful Undo feature, the addition of an oval and a rounded rectangle tool for layouts, color (on a Mac II), full-screen displays in some modes, and hierarchical menus for formatting text.

FileMaker II allows for several different ways to accomplish a given task. Command-key equivalents are abundant. Most importantly, the program's powerful macro capability — called Scripts in FileMaker II — allows you to automate repetitive tasks. Scripts are easy to set up and use. You can add your most frequently used scripts to the Custom menu.

FileMaker II ships with an Examples disk that will be very helpful to most users. Although creating a file from scratch is easy, few users will have to do even that, since they can simply take one of the templates and modify it for their own purposes.

Because FileMaker II is so handy, I keep looking for new uses for it. Currently, the only way to access FileMaker II data outside of the program is through the Export command or via the Clipboard.

I'd like to see Claris, the new publishers of the program, add a DA version of the program similar to Greene Inc.'s QuickDEX, which allows Rolodex-type files to be read and updated. The DA could also be used to dial the phone automatically.

Claris is renowned, of course, for old standbys like MacPaint and MacDraw. These programs have seen better days. Now that Claris is publishing FileMaker II, it has the best flat file manager in the business. Perhaps Claris will be encouraged to upgrade its other programs accordingly.

— Larry Husten

FileMaker II
★★★★½

List Price: $299
Published by: Claris, 440 Clyde Avenue, Mountain View, CA 94043; (415) 960-1500.
Version: 1.0
Requires: 1M with two 800K drives or a hard-disk drive.
Compatibility: Mac II and MultiFinder friendly.
Copy Protection: None

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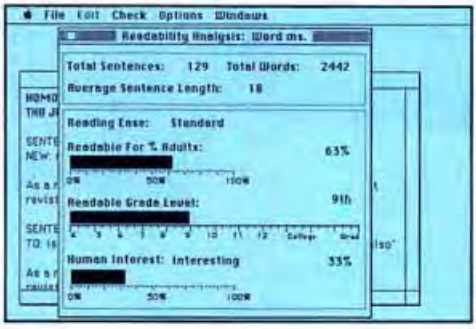
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Quick Clicks



Sensible Grammar corrects some of the more glaring errors that writers make. It also analyzes the word count and structure of sentences to come up with ratings for readability and human interest.



Sensible Grammar is nothing if not flexible; it not only lets you select which kinds of phrases to check but also allows you to specify your own problem words and specify what substitutions the program should suggest.

WORD PROCESSING

Sensible Grammar

I hate programs like Sensible Grammar. Never mind that it works. The very fact that a computer program can scrutinize a professional writer's work and make reasonable suggestions makes me mightily uncomfortable.

Sensible Grammar takes a file in Word, MacWrite, PageMaker 1.0, Works, or text format; reads through it; and flags possible examples of awkward writing, clichés and jargon, inappropriate contractions, mismatched quotes, and the like. The program proposes repairs that you can accept, reject, or mark for subsequent fixing.

The program works by comparing words and phrases in your file with several lists of words and phrases it holds in three different folders. The advantage of that approach is that it lets you see what the program is looking for. It also lets you add items of your own and delete those you'd rather let slide. The disadvantage is that it makes Sensible Grammar dreadfully slow. (Sensible Software says that a new version, 1.1d, is 20 percent faster than the version reviewed.)

A 3,000-word document took well over a half hour to check. What's worse, Sensible Grammar requires constant attention; you can't leave it to work and come back later to fix what it caught. Also, most of the suggestions are rather nit-picking — perhaps an inevitable result of a computer program that can't tell the difference between major sins and minor peccadillos.

If speed is important, you can turn off Sensible Grammar's checking of various flaws. For example, you can tell it to forget about expanding contractions but continue to track sexist or racist phrases.

Sensible Grammar also lets you see proposed changes in context before you have to accept or reject them — a strong feature. Also, it creates log files of nonobvious errors such as homophones and words or sentences that may be too long to be clear.

As the program works its way through your file, it keeps track of the file's readability and human interest. *Readability* I understand; it's the grade level at which the writing is aimed and the percentage of adults who supposedly will be able to read the item. *Human interest*, though, defeats me. The manual never really explains it, though it says it's possible to have a rating of over 100 percent. I've got a serious problem with a computer telling me about the human interest of a piece of writing.

As an example of how the ratings work, I ran the manuscript of "Reworded," from *MacUser*'s March '88 issue, through Sensible Grammar. The program told me that the piece was written at a ninth-grade reading level, which can be understood by 63 percent of the population. It also rated the human interest of the piece at 33 percent — whatever *that* means.

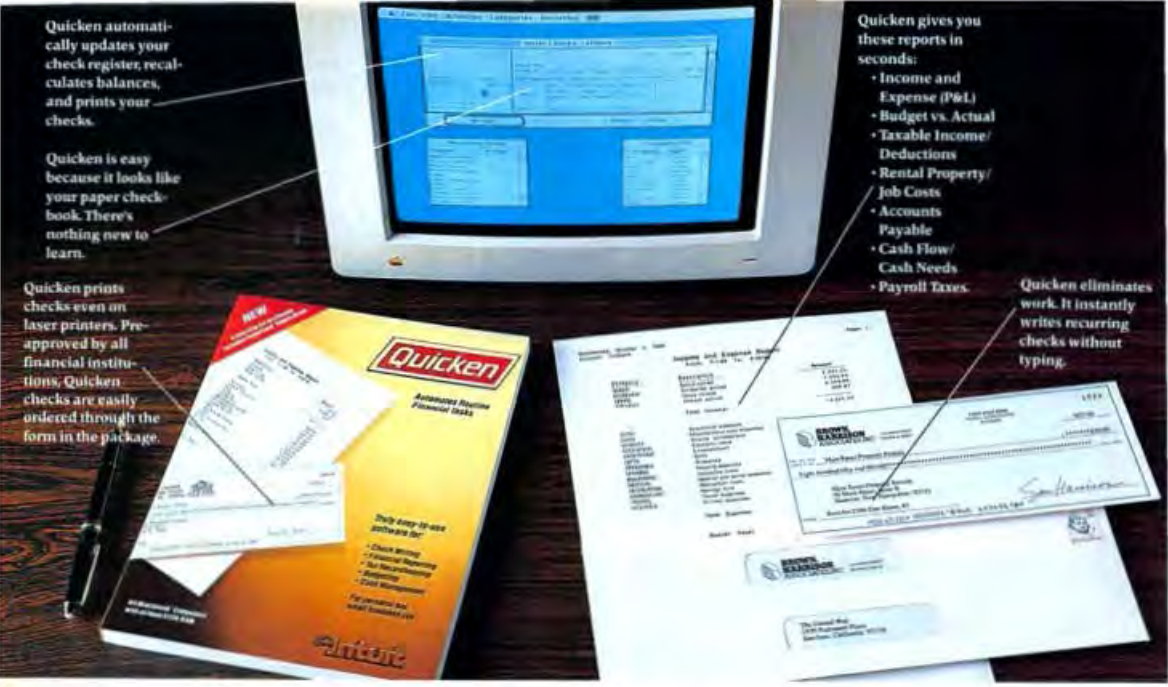
For professional or otherwise comfortable writers, Sensible Grammar is far too sluggish to be of much use. For those uncertain about their writing, though, the program can be an effective coach. It would be more effective if it were faster and if it could distinguish between major errors and the small stuff. Software like this still has some growing to do.

— *Daniel J. Rosenbaum*

Sensible Grammar



List Price: $99.95
Published by: Sensible Software, 335 East Big Beaver, Suite 207, Troy, MI 48083; (313) 528-1950.
Version: 1.1c
Requires: 512K
Compatibility: Mac II and MultiFinder friendly.
Copy Protection: None



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—David Beaver, **MacWeek**

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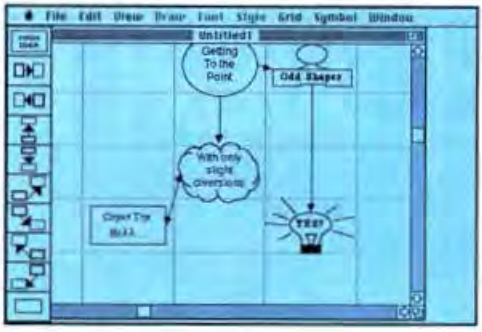
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MU 1288



Inspiration's flowcharting tools let you free-associate ideas visually and then automatically dump the flowchart into an outline.

ORGANIZATIONAL TOOLS

Inspiration

If you're the type of person who generates ideas by scribbling circles and arrows on a yellow legal pad, then Inspiration was made for you. Its outlining and flowcharting features are designed to help you organize disconnected thoughts.

You start with an idea — a flash of inspiration — and jot it down electronically. As more ideas come to mind, the program organizes them into a flowchart of symbols and links; it exhibits their logical connections and visually diagrams the thought process. Inspiration doesn't restrict you to a diagram display. If you prefer, you may also work with ideas in the traditional, linear outline form. Changes made to one form are reproduced automatically in the other.

The program takes advantage of the brain's different approaches to thinking. By presenting a visual image showing how your ideas are connected, it stimulates the logical left side of the brain. This enables you to work with ideas more easily. Since you don't have to pen your thoughts in standard outline form (main idea, topic, subtopic, and so on), the program inspires the creative right side of the brain and lets you be as innovative as imagination permits.

This program is simple to master. The opening screen depicts a grid of intersecting lines with a palette of objects displayed down the left side. The grid is the underlying structure that assists you in placing your symbols. New symbols are automatically centered in a box of your choosing. The framework of intersecting lines also provides a reference point for symbol size. You may increase the size of symbols as large as you need by selecting and dragging the square black handle to the desired width and height. The grid can be turned off if you find it too distracting.

The tool palette contains eight predefined shapes to hold ideas. Each has a link pointing in a specific direction. When a shape is selected, it appears in a box on the grid, automatically linked to the one placed there before it. You may alter the visual display of a shape by selecting from ten different symbols in the Symbol menu. These include a light bulb, cloud, rectangle, and circle, among others.

When you type in an idea, it appears on-screen inside a symbol shape. The text automatically wraps to the size of the symbol and the shape grows to hold all your thoughts. A rapid-fire feature lets you add ideas very quickly without paying any attention to the physical structure of symbols and links. Inspiration generates symbols and places your ideas inside them when you press the Return key at the end of each thought.

In addition to the eight predefined palette shapes, there are two special symbols — Main Idea and Rectangle. Click on Main Idea to return to this symbol from anywhere on the diagram; or click on Rectangle to generate an unattached symbol, free of any links to other shapes. You may add your own links to the Rectangle or leave it free-form for special effect.

While Inspiration is a helpful outlining tool, it suffers from being overly obsessed with itself. It's easy to get so carried away with choosing symbols and links; moving symbols around; and changing symbol shapes and sizes, linkage types, arrow direction, fonts, and font sizes that you forget your main objective: working on actual ideas. In its favor, there is a Rapid Fire option that allows you to forget about the look of a flowchart when you're on a creative roll. Just press Return after each idea, and Inspiration will automatically place it in symbols after you stop typing.

Another snag concerns the manual. The program may in fact be a deus ex machina, but the binding on the manual is painfully poor. The pages are glued to the the spine rather than stapled or sewn. Expect the pages to become loose and the book to fall apart (mine did) as you thumb through the chapters.

If you are hunting for a software tool to stimulate creative thought, take a look at Inspiration. You can save the diagrams for export as PICT files or the outlines for export as text, Microsoft Word, MacWrite, More, or ThinkTank documents. Inspiration, while not inspired itself, is a useful visual outliner that some will find very handy.

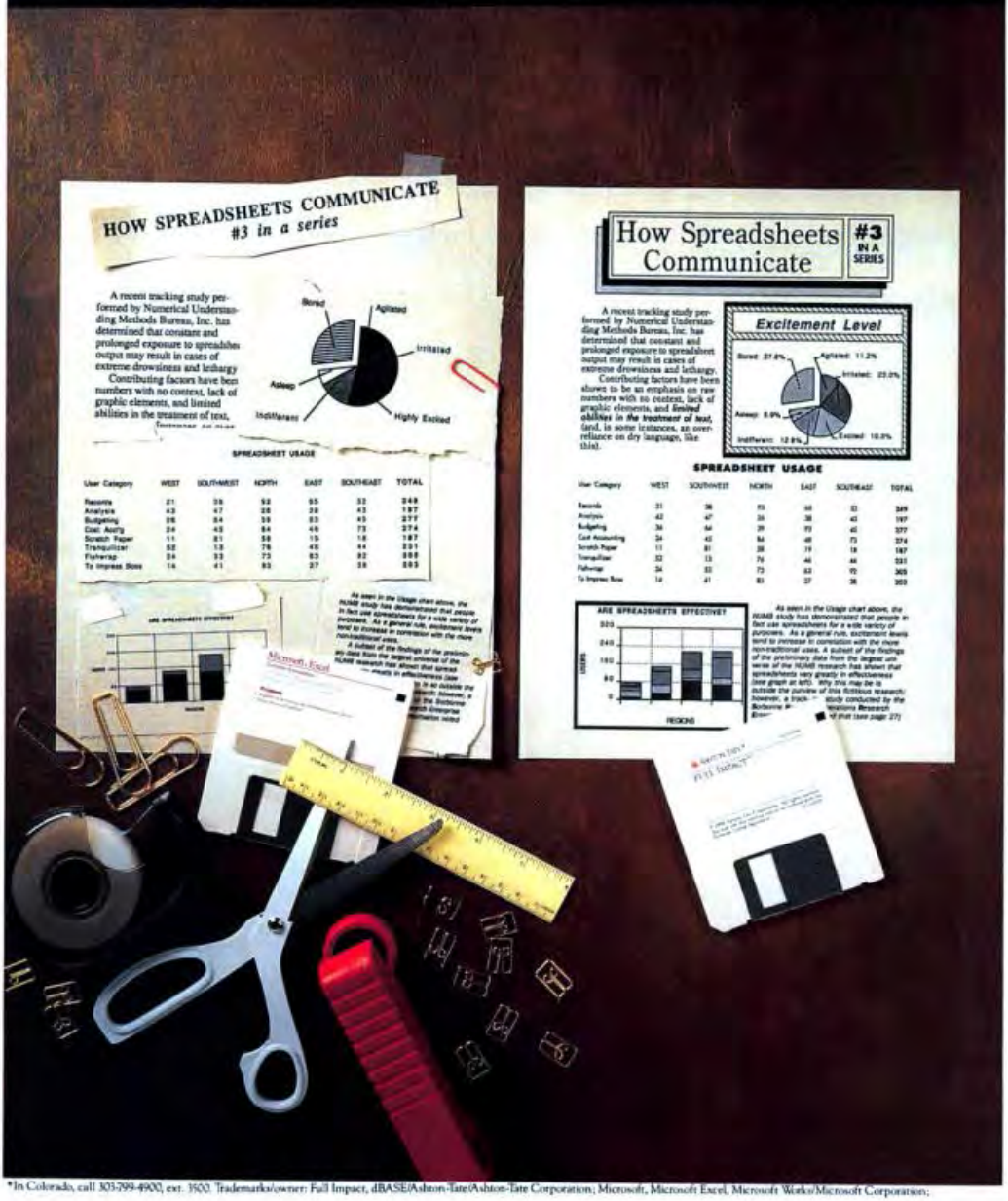
— Carol S. Holzberg

Inspiration
$$$



List Price: $149
Published by: Ceres Software, 9498 Southwest Barbur Blvd., Suite 103, Portland, OR 97219; (503) 245-9011.
Version: 1.0
Requires: 512KE and an 800K drive or a hard-disk drive.
Compatibility: Mac II and MultiFinder friendly.
Application Size: 157K
Copy Protection: None

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Optional Automatic Saving	Yes	No
Access RAM beyond 1Mb	Yes	No
Print charts and spreadsheets on one page	Yes	No
Line, Rectangle, Oval Drawing Environment	Yes	No
"C"-like procedural macro language	Yes	No

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The Tempo II macro recorder is flexible in its various recording settings. It can remember menu selections by position or name. Thanks to the program's new Smart Features, you can use windows and buttons in macros without worrying about whether they appear in the same place every time they're on-screen.



The Configure menu lets you specify what keystrokes will access Tempo II pop-up menus, what your default macro file will be, and how fast your macros will play.

UTILITIES

Tempo II

A distinctive feature of the Macintosh interface upon its debut was the mouse. While other personal-computer users muddled through with the same typewriter-style keyboard that Mark Twain used, the Mac had this cute little pointing device. Sure, there was a keyboard too. It was there in case you had to enter text.

That's all changed. Today's Mac keyboard is a far more important part of the user interface. The extended keyboard, in particular, has every amenity a typist could want. To exploit all those function keys and Control-key combinations, though, you need a keyboard macro program. Macros let you define a keyboard shortcut for commands (or other input) that previously demanded mouse action or a lot of typing. Tempo II is such a program, and it has enough bells and whistles to keep any extended keyboard busy for a long time.

Several keyboard macro programs are currently available for the Macintosh, and Apple's System 6.0 includes a simple program called MacroMaker. But Tempo II, as its name implies, is a second-generation product. It has more features (and a correspondingly higher price tag) than both its predecessor and its competitors.

Why would you want to spend more than $100 on a keyboard macro program — especially if Apple includes one with the System? Simply because the sophisticated nature of the Mac interface demands a lot from keyboard macro programs. What's "intuitive" for users often leaves a macro program bewildered. In other words, on the Macintosh, keystrokes alone won't get you far. For instance, you have to record menu selections (performed with a mouse), toggle checkboxes (that mouse again), and even draw rectangles on the screen (using you know what). This stuff can get complicated, but Tempo II seems capable of handling it with aplomb.

What sorts of things can your Macintosh do with macros? Personally, I use them for everything from typesetting codes to keeping my desktop tidy (close all windows and empty the Trash, please), sending files to the typesetter via modem, setting the access privileges for network folders (saves nine clicks!), and waking my brother-in-law at precisely 8:00 A.M. with the Mac's rendition of a Bach invention.

While there will always be some onerous chores that a macro program just can't handle, Tempo II has some logical branching features that give it the ability to make simple decisions. For instance, you could have it scan a spreadsheet or database and delete or filter data values according to a specified criterion. This is a powerful alternative to doing the same thing using the application's own programming facility — assuming the application even has one.

Tempo II is technically a DA that you must install in your System and then launch from the Apple menu, but that's not the most convenient way to use it. It doesn't take long to get annoyed at trying to invoke one of your oft-used macros and staring stupidly at the screen before remembering that you haven't loaded Tempo II yet. Fortunately, the program comes with a tiny Kickinit program that automatically performs this chore at startup.

Convenience is a major issue with a program like this. If it's too much of a hassle to create or edit a macro, it's not worth the bother. Unlike some of its competitors, Tempo II excels at simple creation of short sequences of actions. You simply invoke the program, do what you want to do, and save your efforts as a macro file. Tempo II also lets you link individual macros together so that you can take a more modular approach to building complicated sequences.

Tempo can remember menu items by name, so you can actually use it to navigate a series of menus that might

change from time to time. A feature that lets you transfer directly to another application or file without visiting the Finder can be a tremendous timesaver — especially for MultiFinder-shy users.

With all this power come some negatives. Tempo II is slower on playback of text strings than other macro programs. Since the program is designed to make using the computer more convenient, it's irritating that, after Tempo II has played a macro, it leaves the pointer just below the Tempo II menu item at the upper-right corner of the screen instead of leaving it where it was when the macro was played. It's as if the programmers assumed that the next thing you'd want to do is pull down the Tempo II menu.

Tempo II is well documented on paper, but the user interface is intuitive enough that most operations won't require poking your nose in the manual. Some advanced techniques, such as branching and conditional comparisons, require a little study. Registered users receive 90 days of free telephone support, so you might want to try some ambitious macros before your time's up. Or perhaps you should hold off registering until you're ready to attempt the advanced macros.

For owners of extended keyboards, getting a macro program is like letting the other shoe drop. If your taste runs to fancy, well-made, slightly pricey shoes, Tempo II may be for you.

— *James Bradbury*

Tempo II
★★★★½



List Price: $149.95
Published by: Affinity Microsystems, Ltd., 1050 Walnut Street, Suite 425, Boulder, CO 80302; (303) 442-4840, (800) 367-6771.
Version: 1.0
Requires: 1M
Compatibility: Mac II and MultiFinder friendly.
Application Size: 207K
Copy Protection: None

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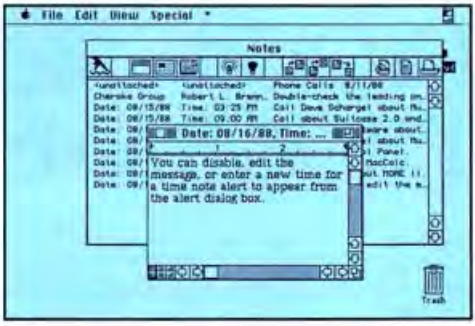
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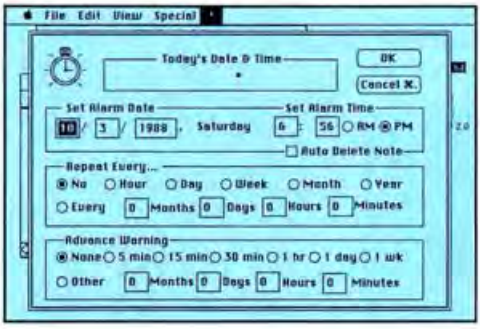
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Quick Clicks



Comment brings the concept of Post-it notes to your computer screen. You attach a note to a spreadsheet cell, a word in a text document, or a window on the desktop. Shown here is the Note Manager, which lets you print, delete, search, and save notes.



One of Comment's stronger features is its ability to set timed notes that appear when you want or as periodic reminders.

U T I L I T I E S

Comment 2.0

Post-it notes rank as one of the greatest inventions of the twentieth century. They mark your place in a book, alert you to impending appointments/meetings, and add commentary to a document without marring the manuscript. Comment 2.0 (formerly know as Memorandum) is a desk accessory that brings the electronic equivalent of yellow stickies to the Macintosh.

If you want to attach a note to a cell in a worksheet (or to a word or phrase in a text document), you select the cell and choose the Note command. Comment opens a window which is, in fact, a mini word processor. You set the font and size for the note, as well as the left, center, or right justification of the text. Each note window has its own ruler and margin settings. You resize the window and position it exactly where you want it to appear. You then save your current settings as the defaults by holding down the Option key when closing the note.

Once you have attached a note, you can show it at any time. The Mark Viewable Notes command places a visible mark next to the word or cell that a note is attached to, and the Show Viewable Notes command opens all of the note windows that are on-screen.

Besides the regular note, there are *window, scratch,* and *time notes.* A window note is exactly like a regular note but is attached to a specific window instead of a word or a worksheet cell. This can be a window on the desktop or a document window.

A scratch note is a convenient scratch pad where you can enter notes about anything. This allows you to create a "to do" list, a list of phone numbers, or boilerplate text that you use every day. Or you can paste in pictures and use Comment as a replacement for your Scrapbook.

Time notes are the most significant feature of the program. You can set a note to appear at a certain time or have it repeat every hour, day, week, month, or year. When a time note appears, you can set when it will reappear from the alert box. You can also disable the note or open it and make changes to the message.

The Note Manager gives you access to all of the notes in a note file. From it you can delete notes from a note file, read notes in from another file, disable time notes, set the print options, and print all or just a few of the notes in a file. You can change the point of attachment and the document a note is attached to. There is also a Find command that lets you search all of the notes in a file. This is particularly handy, since each file can contain as many as 520 notes.

Comment is fully compatible with MultiFinder. It opens in the DA Handler layer and is always open no matter which programs you run. If you aren't running MultiFinder, the AutoLoader INIT keeps Comment active whenever you change programs. And the keyboard commands work no matter what layer you are in at the moment.

If Comment 2.0 only attached electronic notes, it would be a very handy program. But the added feature of time notes gives you more flexibility and options than other programs whose primary purpose is to set alarms. This is an important upgrade to an already good program.

— Fred Terry

Comment
★★★★



List Price: $99.95
Published by: Deneba Software, 3305 Northwest 74th Avenue, Miami, FL 33122; (305) 594-6965, (800) 622-6827.
Version: 2.0
Requires: 512KE
Compatibility: Mac II and MultiFinder friendly.
Application Size: 123K
Copy Protection: None

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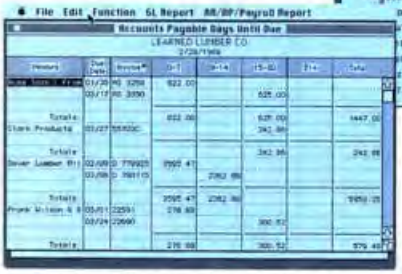
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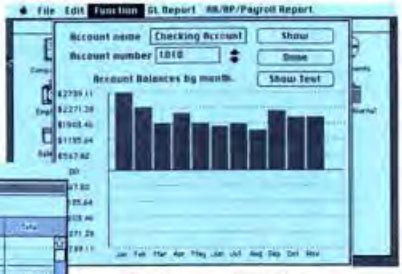


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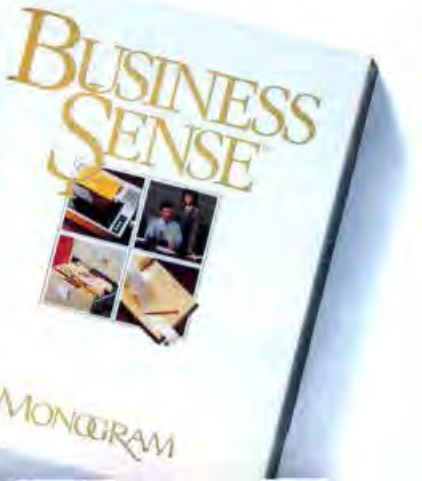
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*Business Software Magazine Accounting Survey, July, 1987

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Quick Clicks

COMMUNICATIONS

StuffIt

It seems that files just keep on getting bigger and bigger. Some basic databases weigh in at over 800K, and scanned TIFF images can be 3, 4, or more megabytes. Way too much for a diskette drive. It's not a problem if you have a large hard disk, but if you want to transfer that information via modem, you're talking about a lot of connect time. There is an alternative. StuffIt, a file-compression utility, makes living with large files much more bearable.

StuffIt compresses and encrypts files. You can also join several files as one larger file that is less (in K) than the sum of its parts. Typically, users turn to StuffIt when they need to download or upload a file or files to a BBS or a telecommunications service like GEnie. StuffIt's data-compression features reduce telecommunications time and cost significantly. If files belong together, StuffIt packages them neatly. The person receiving the files also needs StuffIt to decompress them. And if you have sensitive files, StuffIt has a data-encryption feature based on the National Bureau of Standards' Data Encryption Standard (DES).

Although StuffIt is a technically complex program, it is remarkably easy to use. Archiving and compressing a group of files is a simple procedure. Choosing New from the file menu allows you to name your archive file. Clicking Add or Multiple Add in the StuffIt window then gives you a standard Macintosh window in which you can choose the files you want archived. When you're done, click on Archive, sit back, and watch StuffIt strut its stuff.

Extracting files from a StuffIt archive is even easier. Double-clicking on a StuffIt file and holding down the Shift key will automatically open StuffIt and extract all files onto the current volume.

StuffIt can really save a lot of space on your disks. Although you wouldn't want to archive files you use frequently, you can save lots of storage space by compressing infrequently used files.

StuffIt's File-Compression Savings

Document	Original Size	Stuffed Size	% Saved
PageMaker 3.0	179K	54K	70%
SuperPaint	37K	23K	36%
HyperCard	24K	13K	49%
Word 3.0	15K	8K	46%
FileMaker Plus	387K	220K	43%



StuffIt makes living with large files bearable. This handy utility compresses files to a fraction of their original size so that you don't have to spend as much time on-line. Shown here is StuffIt compressing a TIFF image that previously wouldn't fit on an 800K 3.5-inch disk.

Considering all it has to do, StuffIt zips along quite nicely. The largest file I tried, the 387K FileMaker Plus file, took about two minutes to archive. Some of the shorter files were done seemingly instantaneously.

StuffIt has gained a deserved reputation as being virtually bullet-proof. It handles errors well. Most users familiar with Macintosh basics won't even have to open the manual. But eventually they'll want to, because the manual provides several tips to speed things up even more. It is clear, concise, and informative.

Raymond Lau, the author of StuffIt, has made every effort to ensure that his program has the greatest possible utility. For instance, StuffIt can unpack and convert files in the Packit format (the previous Macintosh file-compression standard) and encode and decode BinHex4 hqx files (don't even ask!). It can segment extremely large files, so that disk storage becomes possible for, say, a 2-megabyte PageMaker or 4th Dimension file. Finally, an option in the Multiple Add mode allows the user to automate and program StuffIt to a modest degree.

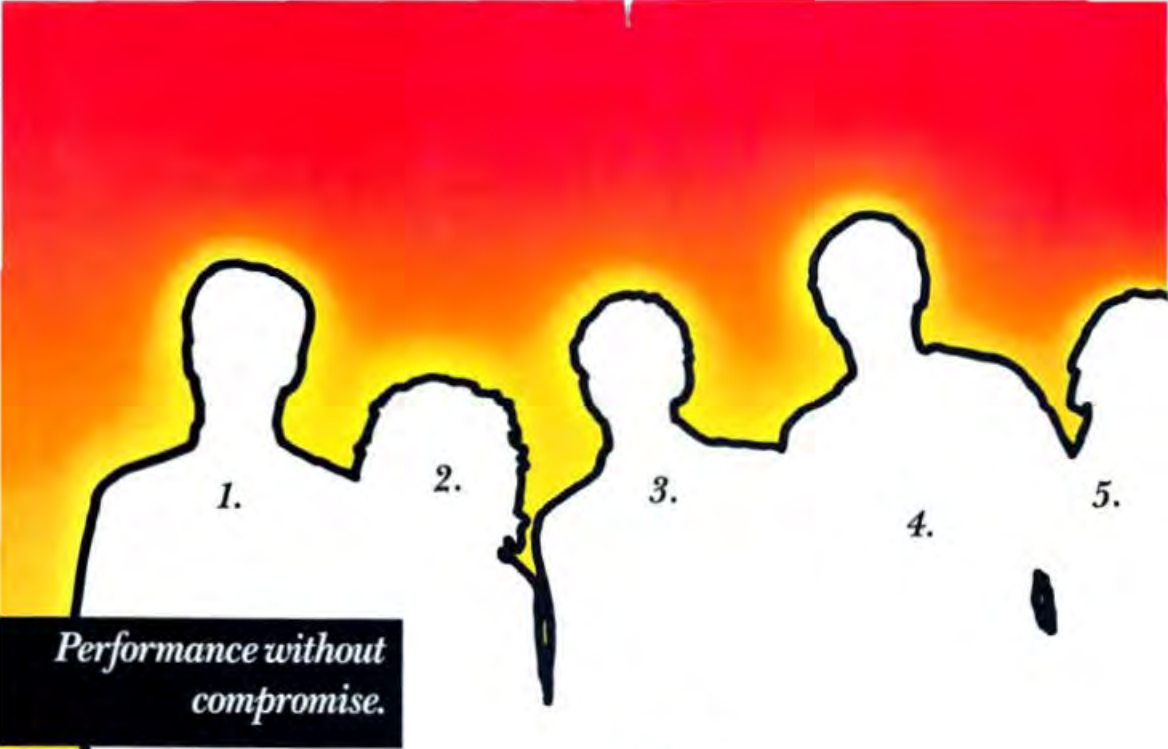
StuffIt is available on a modified shareware basis. If you use it only to unstuff files, it's free. If, however, you use it to archive files, it's $18. The author continues to upgrade and maintain the product — at least one more major upgrade is planned. Recently Lau released a set of StuffIt utilities, including a DA to unstuff files. These are available for $18, or $15 to registered StuffIt users. StuffIt is available on all the major telecommunications services and Macintosh-oriented BBSs. It is also available directly from its author. If you don't already own StuffIt, get it. It's hot stuff.

— *Larry Husten*

StuffIt



List Price: Shareware fee, $18.
Published by: Raymond Lau, 100-04 70 Avenue, Forest Hills, NY 11375-5133. Also available on CompuServe, CIS 76174,2617; GEnie, RayLau; Delphi, RaymondLau; MacNet, RayLau.
Version: 1.5
Requires: 512KE
Compatibility: Mac II and MultiFinder friendly.
Application Size: 115K
Copy Protection: None



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Solution: The DataFrame XP 60 + 40, with 60 Mb of fast storage, and our ultra convenient, industry standard DC-2000 40 Mb tape drive.

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4. The Desktop Publisher: DataFrame XP 60 + Bernoulli

Users with big data applications like desktop publishing or databases *love* this combination hard disk and removable Bernoulli® cartridge. 20 Mb removable Bernoulli cartridges make backup and archival storage fast and easy. And what a system: 60 + 20 means 80 Mb on line, with infinite storage on the shelf.

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one in the office.



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For people who want all the performance a Mac II™ can deliver: Here is the biggest capacity drive that fits into the Mac II, and the fastest drive, bar none!

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Need to get files back and forth to different offices? Equip each office with a high performance DataFrame 60 + Bernoulli. Then use the convenient 20 Mb cartridges to ship information back and forth. Users at each office have high performance drives with fast cartridges for backup and archiving.



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by Jim Seymour

Stuck The Way We Were

The Way We Were. It isn't just an old Barbra Streisand/Robert Redford three-hankie tear-jerker. It's an odd and oddly crippling disease that afflicts many parts of our lives. We notice how things are but then fail to notice how they change over time. So at some point six months or six years later, we're still going along merrily thinking things are the way they *were*, not the way they've become.

I've been thinking about TWWW a lot lately, because I recently spent some time at a very large American corporation, a long-time client in my consulting practice, and I kept running into the syndrome.

For about two years I've been playing a little game with friends, acquaintances, and clients called "What's Wrong with the Macintosh?" I ask that question, then sit back and listen to their answers. And note how obsolete those answers usually are. I've never been brought up as sharply by the gap between obsolete perception and current reality as I was at this company.

I was working with an erstwhile manager who's eager to bring Macs in, in large numbers. He thinks the company is ripe for them, and not only because he believes Macs are better choices than IBM PCs, PC clones, or IBM PS/2s. This place still has dedicated word processors on most secretaries' desks, for example, and many other secretaries have only typewriters. The "I Can't Type" and "I Have People to Do That *For* Me" syndromes are deeply entrenched among middle- and upper-management types.

The company's MIS shop is pretty good, with intelligent but passive management; this is a company devoted to mainframes and dumb terminals. Since business is booming, with cash sloshing through the till, there's a new



openness to the kind of changes that offer strategic benefits as well as cost savings. Thus the company is looking at moving in some kind of desktop computers on a company-wide basis. So I agree with his fundamental assumption: The time is ripe for the Mac.

For two days we strolled and chatted and shmoozed and tried to debunk some myths — "consulting by walking around," to twist Tom Peters' "management by walking around" line.

Because the first half-dozen or so people I talked with were resolutely anti-Mac (or actually, more anti-Apple than anti-Mac — they didn't know enough about what they were talking about to be anti-Mac yet), I started playing the "What's Wrong with the Mac?" game. From their answers, you'd have thought this was fall, 1985, rather than 1988. You and I and another million or so of our close friends know very well what's happened to the Mac since it was introduced, and how rich its tools are today. But we forget that the great majority of business people aren't nearly so *au courant* as we are on the State of the Mac. Nor as predisposed to assume things will get better still.

If you're reading *MacUser*, you probably know all this stuff already, but I thought it might be useful to run through the litany of complaints I heard about the Mac from the "agin'ers" at this company. If you're working to help establish the Macintosh as the standard — or at least as a second standard — in your company, you may want to use this as a checklist to prep yourself for what you'll hear, and how you can respond.

"There's not much real business software on the Mac yet." Ha! The good stuff now appears first on the Mac, then migrates to the PC. If and when Microsoft Windows becomes more popular in the MS-DOS world, that trend will accelerate, since Windows is the natural porting tool (and, some would say, the final resting place) for Mac apps brought over to the PC. Examples? Excel, the world's best spreadsheet. PageMaker, the best general-use desktop-publishing package on either system. And FoxBASE, the dBASE-compatible DBMS for grown-ups. When we see exceptional programs that have gone the opposite way, from the PC to the Mac, it's often because they were available on the PC before the Mac existed, or because the inherent character-based nature of the programs made the fifteen-times-larger PC market the logical starting place. Microsoft Word is a good example of the former; Microlytics' Word Finder and GOfer utilities are examples of the latter.

And the future? Consider FullWrite Professional, now an Ashton-Tate product. Look for A-T to continue to upgrade their aging PC word-processor, MultiMate — no one could walk away from all that upgrade in-

BOB SCOTT

come, but also to bring FullWrite to the PC as fast as their coders' little fingers can fly. Because they, and you and I, know that's where the future of word processing lies. Available today on the Mac, of course.

"*The screen's too small.*" You bet. I agree. So plug in a larger screen. Or better still, buy a Mac II, stick the system box on the floor under your desk, and work in comfort and without eyestrain with just a nice large monitor (from Radius, Nutmeg, E-Machines, SuperMac, Moniterm, or any of a half-dozen other vendors) and the keyboard on your desk. Unless, of course, you're only an occasional user of a personal computer, in which case you'll probably be happy indeed to put up with the Mac SE's small screen in return for how unintrusive its truly tiny footprint is on your desktop.

"*I'm used to a color display.*" Me, too. See the previous answer.

Today Macs are about as hard or as easy to network as MS-DOS machines.

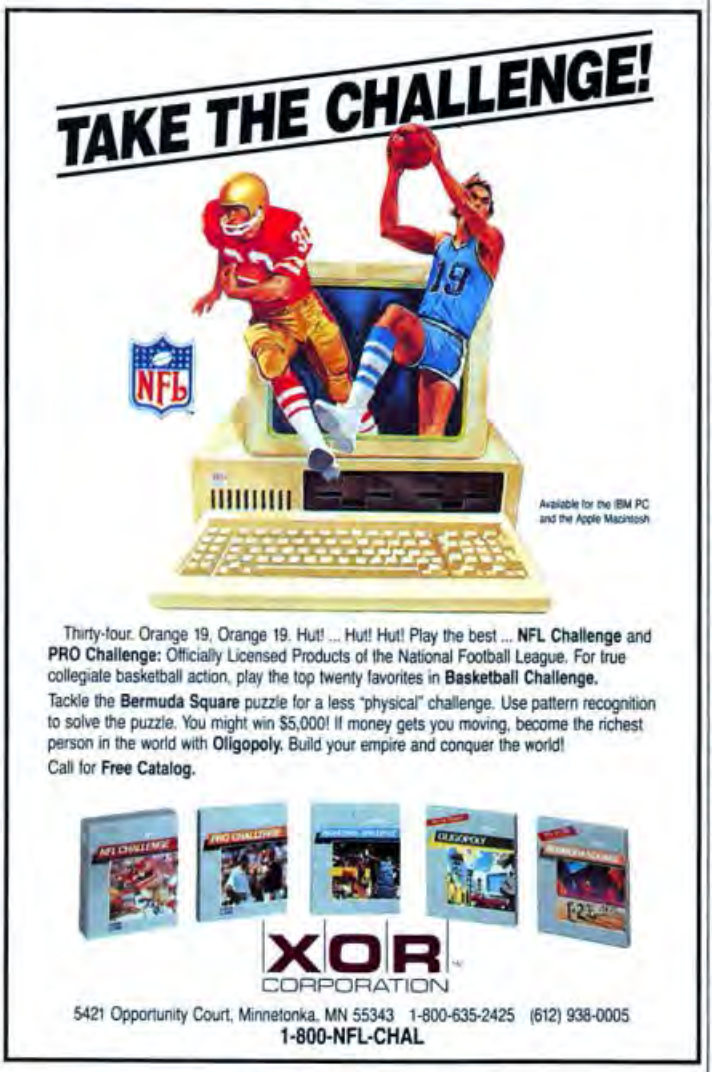
"*I hate mice.*" Of course you do. You've never used a Mac, and your experience is with the klutzier uses of a mouse on an MS-DOS machine.

"*Macs cost too much.*" Compared with what? If you're looking at hard-disk–equipped PCs, PS/2s, or PC clones built around the Intel 80286 or 80386 chip, you'll find comparably priced, comparably powerful Mac models. And if you're *not* looking at those '286/'386 models, you're getting ready to buy the wrong machines.

"*Macs are too hard to integrate into our IBM/DEC/LAN/whatever environment.*" Excuse me: Have you been asleep for awhile, Mr. Van Winkle? Ask DEC about integrating Macs. Or Sun/Centram Systems, the TOPS people. Or 3Com or Novell. Fact is, today Macs are about as hard or as easy to network, or to link to the big iron, as MS-DOS machines. Still not *easy*, mind you, but about as easy as anything else.

Those are the Big Six in the TWWW derby, in my experience. All were once valid; all are today false. But as long as important people in a company stay stuck in yesterday, today's realities and tomorrow's possibilities are beyond reach.

I think I hear Barbra singing somewhere. . . .



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The DeskJet and the Grappler LS

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Apple ImageWriter LQ	216 DPI	$1,399
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Apple ImageWriter II	144 DPI	$599

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Grappler LS

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The Grappler LS is the latest Macintosh interface solution from Orange Micro. The Grappler LS connects the HP DeskJet or any HP compatible serial laser printer to the Macintosh Plus, SE, or II and drives it at its full 300 DPI resolution. To achieve this, the Grappler uses a standard Apple printer driver and translates the output for your printer, allowing compatibility with hundreds of popular packages.

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Make your Grappler output even more effective with three new complete font families and five special headline fonts. Families: ITC Garamond Book, ITC Zapf Chancery Medium Italic, Dutch Italic. Headlines: Blippo Black, Broadway, Cloister Black, Bitstream Cooper Black, and ITC Zapf Chancery Medium Italic.

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InfoWorld, March 14, 1988...

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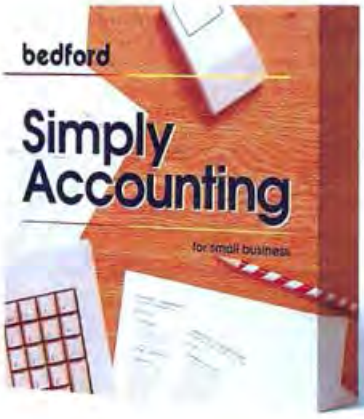
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Ease of Use	☐	☐	☐	☐	☑
Error Handling	☐	☐	☐	☑	☐
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by Robert R. Wiggins

The Many Faces of Apple

Apple has an image problem. Most companies develop image problems by being callous and arrogant and ignoring their customers; or by blundering and doing something stupid or unpopular; or through simple neglect or incompetence. From time to time Apple may have exhibited some of these characteristics on a small scale, but never to the point where it would cause an image problem. No, Apple's image problem is that it has too many images and presents too many faces to the public. Like the blind men trying to describe the elephant, each group of observers outside Apple sees a different face and perceives a different company. Even in its problems Apple manages to be unconventional.

THE PRESS

The face that Apple tries to present to the press, and through the press to the public, is the public relations face. This is the scrubbed-clean face. Unfortunately, the press doesn't want to see a scrubbed-clean face, and gets tired of reporting, "We cannot comment on unannounced products," which is the usual official answer to questions about new products, or reporting, "Apple failed to return our calls," which is the standard response to probing questions.

So the press goes around PR and finds as many faces as Apple has employees. Apple is a collection of many strong individuals — some quite vocal despite the company's efforts to quiet them — and so the press ends up getting varying viewpoints and opinions, and Apple often ends up looking like the right hand doesn't know what the left hand is doing (which is sometimes true, but not as often as it appears so).

Just look at the reports of new CPUs over the years. Apple works on many prototypes and tries many directions



DAVE JOLY

before narrowing the selection. The press hears about or sees these prototypes and reports them as "the next Apple computer."

Since many of these computers never appear, the impression passed by the press to the public is that of a company confused, when that is not really the case.

SECURITY ANALYSTS

The followers of Apple's stock on Wall Street get to see Apple's best face, chairman John Sculley. They get special treatment because their opinions are so important to the valuation of Apple's stock. It helps that for the last few years Apple has had some excellent financial numbers to display, but Sculley was there trying to put his best foot forward even when the outlook wasn't as bright as it is now. Sculley's presence helps overcome doubts in the analysts' minds raised by the inconsistent reports of the press.

FORTUNE 1,000

Users at large corporations, a group Apple courts assiduously, see Apple's Field Marketing face. This is an important face, because if the largest companies in America accept Apple, it makes Apple more acceptable to smaller companies. Not to mention the fact that this is a large market, where an installed base might be measured in hundreds or even thousands of Macs. When first trying to sell the Mac to these companies, this was a face on which Apple tended to fall flat. Mainly due to improvements in the products, but also due to restructuring of field marketing, this face has of late been much less battered.

DEVELOPERS

Apple tries very hard to keep its third-party developers happy by presenting them with its Developer Services face. In the early days of the Macintosh, Apple's evangelists worked very hard encouraging developers to program for the Macintosh, and judging from the quantity and quality of software available now, evangelism, along with technical support and the rest of developer services, would have to be judged a success. This has been one of Apple's best faces forward.

POWER USERS

Many different faces are seen by power users. Apple has no special face to present to them, but they are likely to seek out information about Apple and encounter many faces on their own.

Power users often read much of the computer press — enough to know that the press is not always getting its arms around Apple. Power users are more likely to be active on the telecommunications networks, where they're bound to run across many different

faces of Apple. Programmers, engineers, technical support, evangelists, even executives such as John Sculley and Jean-Louis Gassée can be encountered on networks such as CompuServe. Most of these Apple employees are not officially representing Apple, but their unofficial efforts to help users — on their own time — make this a particularly appealing face.

The average user of Apple computers, the bread and butter of Apple's market, sees Apple's worst face, the dealer network. Dealers who don't know what's going on, who charge the full $50 retail for *copies* of System updates, who don't keep track on AppleLink of new developments, and who generally provide poor support present a particularly poor face to the public. (Don't inundate me with letters about good dealers; I know they exist, and if you are a good dealer or if you shop at one, you know that all dealers aren't as good as you or yours may be.) Recently, after years of complaints and horror stories, Apple created a Customer Satisfaction group to try to control and improve the face shown to the average user. This may be a case of too little too late, but if it works it can go a long way toward improving Apple's image.

So what can Apple do to improve its image? The No. 1 priority should be improving the dealer network, and the Customer Satisfaction group is an excellent step in the right direction. More rigid dealer certification and periodic recertification would be an improvement. Surprise dealer inspections to check the dealer's service could help weed out dealers who aren't serving their customers' needs.

Since so many people have their image of Apple filtered through the press, Apple should work on improving that image, too. For this they could take a leaf from IBM's book, which is well-known for showing a uniform face to the press and the public.

The best thing Apple could do to improve its image is to get its executives out even more. John Sculley has improved tremendously as a public speaker since joining the company, and is Apple's best face forward. It's too bad Apple can't clone Sculley to free him up for even more public appearances. Since that won't work, Apple should get Jean-Louis Gassée out as much as possible, too. Gassée's European charm and savoir faire make him a natural for presenting a good face to the public. Anything Apple does to make its image more consistent will be an improvement.

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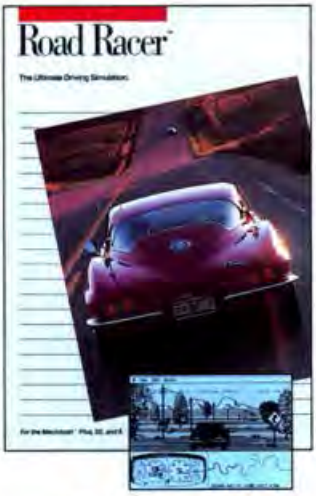
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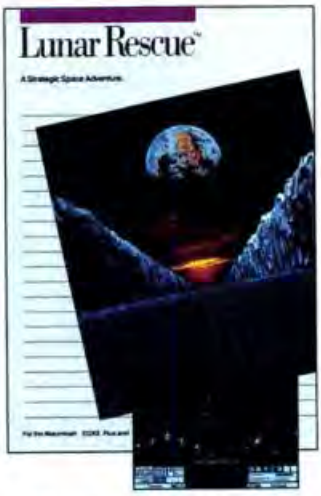
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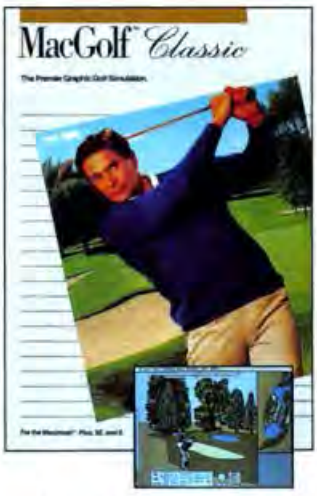
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Epic 2400 Int. SE	315.
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MDIdeas Commlink 2400	189.
Migent	
Migent Pocket Modem *(ext. 300/1200 Baud)*	115.
Novation Novation Parrot 1200	109.
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Practical Modem 2400SA	189.
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Promodem 2400M Ext. *(Software & Cable)*	199.
Promodem 2400 *(Hayes Compatible)*	309.
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New Enhanced Version III Modules!	
Rags to Riches 3-Pak 3.1 *(GL/AR/AP)*	289.
Rags to Riches GL, AR, or AP	120.
Dac Software Dac-Easy Light	45.
Intuit Quicken	35.
Layered Insight One Write	185.
Insight Expert GL, AR, or AP	479.
MECA Managing Your Money	129.
Migent In House Accountant	119.
Monogram Business Sense	279.
Dollars & Sense 4.0	81.
North Edge Software Timeslips III	119.
Peachtree Back To Basics Professional *(GL/AR/AP/INV)*	159.
Survivor Software	
MacMoney 3.0 *(Enhanced Ver.)*	***Special*** 62.

Networking Software & Hardware

CE Software Quick Mail	169.
Infosphere	
MacServe *(Network Software)*	158.
LaCie Silverserver	99.
Microsoft Microsoft Mail 1-4 users	195.
Nuvotech	
TurboNet 128/512k or TurboNet Plus	27.
Olduvai Software Clip Share	109.
Font Sharer	149.
Shiva NetModem V1200	359.
NetModem V2400	479.
Net Serial X232	309.
NetBridge	309.
SuperMac Software Acknowledge	349.
Multi-User SuperLaserSpool	199.
Symantec InBox-MacConnection	79.
InBox-Starter Kit V2.0 *(3 Personal Connections)*	199.
TOPS	
Tops 2.0, Tops FlashCard or Net Print	119.
Tops Repeater	129.
Tops Teleconnector Din8 or DB9	39.

WriteNow 2.0 by T/Maker



WriteNow 2.0 is the long-awaited update of the easy-to-use, easy-to-learn, powerful word processor from T/Maker. The features added to this award-winning word processor include a 100,000 word dictionary and spellchecker, WYSIWYG multiple columns and graphics support, an unlimited number of open documents, and counts for characters, words, and paragraphs. The folks at T/Maker have turned WriteNow 2.0 into a powerful business tool with mail merge and increased operating speed that puts the competition to shame. WriteNow 2.0 is the solution for your word processing needs.

WriteNow 2.0 ..... **105.**

Communications Software

Compuserve	
Compuserve Starter Kit	24.
Grolier On Line Encyclopedia	32.
Compuserve Navigator	45.
DataViz MacLink Plus with Cable	145.
Dow Jones Desktop Express	95.
Freesoft Red Ryder V10.3	55.
Hayes Smartcom II 3.0	88.
Peripherals Computers & Supplies	
VersaTerm	69.
VersaTerm-Pro	199.
Software Ventures	
Microphone II *(Includes Glue)*	225.
Traveling Software LAP-LINK	85.

Utility Software

AlSoft Disk Express	35.
Font/DA Juggler Plus	42.
Berkeley System Design Stepping Out II	54.
Beyond Inc. Fore Runner	32.
CE Software	
QuicKeys *(Macro Program)*	54.
Central Point Software	
Copy II Mac *(Includes MacTools)*	20.
PC Tools Deluxe Mac	49.
Emerald City Software LaserTalk	187.
Fifth Generation Systems Suitcase 2.0	49.
FastBack For The Macintosh	54.
Power Station	37.
Infosphere Liaison	129.
Microlytics, Inc. GOfer	45.
Microseeds Redux	65.
Olduvai Software Icon-It! or MultiClip	39.
Read-It! TS *(For Thunderscan)*	79.
Read-It! O.C.R. 2.0 *(For Image Scanners)*	***Special*** 199.
PCPC HFS Back-Up	28.
SuperMac Software SuperSpool 5.0	54.
SuperLaserSpool 2.0	82.
Diskfit 1.4	54.
Sentinel 2.0	155.
Symantec MacSQZ!	49.
Symantec Utilities for Mac *(S.U.M.)*	59.
Williams & Macias Disk Finder	29.
myDiskLabeler w/Color	31.
myDiskLabeler w/LaserWriter Option	34.
Working Software/MediaGenic	
Findswell 2.0 *(Document Finder)*	36.

DataDesk Professional by Odesta



DataDesk Professional is the data analysis package that lets you see, explore, and understand the meaning of your information. Even if you're not a computer expert or math wizard, *DataDesk Professional's* icon-based point and click user interface lets you easily create histograms, bar charts, scatterplots, boxplots, and rotating plots. You can use *DataDesk Professional* with data you import from databases and spreadsheets, and export charts and plots to desktop publishing and word processing packages to add life, and information to your reports and presentations. *DataDesk Professional* brings the power of statistical vision to your Macintosh.

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Alphabet Blocks	32.
Broderbund Jam Session	30.
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Type!	31.
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Coda Mac Drums	35.
Davidson & Associates Speed Reader II	39.
Math Blaster or Word Attack!	27.
Electronic Arts Mavis Beacon Typing	36.
Venture's Business Simulator	47.
Deluxe Music Construction Set V2.0	61.
1st Byte/Electronic Arts	
Kid Talk, Speller Bee, First Shapes, or Math Talk	32.
Great Wave Software KidsTime	26.
Learning Company	
Reader Rabbit	33.
Mindscape Perfect Score SAT w/ The Perfect College	46.
Nordic	
MacKids Educational Programs *(each)*	28.
Simon & Schuster	
Typing Tutor IV	35.

Blackjack Ace by Centron Software



Blackjack Ace by Centron Software brings the fast-paced suspense filled action of one of Vegas' most popular card games to your Mac. Play against the computer or with up to three people — you choose the stakes and the number of decks. *Blackjack Ace* helps you keep track of the deck with any one of three different counting systems, and its manual features tips on strategy and money management. Feel the excitement of Vegas without risking a fortune. Get *Blackjack Ace* today!

Blackjack Ace ..... **28.**

Accessories

Abaton ProPoint *(ADB Mouse for Mac SE & Mac II)*	99.
Asher Engineering	
Turbo Trackball *(Mac & Mac+ or Mac SE & Mac II)*	69
CH Products	
Mach IV Plus: Quad or ADB	65.
Mirage: Quad or ADB *(Turns Joystick Into Mouse)*	39.
Curtis Manufacturing	
Emerald-Surge Suppressor-SP-2	36.
Ruby-Surge Suppressor-SPF-2	55.
Cutting Edge Cutting Edge EADB-105 Keyboard *(Mac SE & Mac II)*	135.
DataDesk	
MAC-101 Keyboard/Beige *(128k/512K & MacPlus)*	139.
MAC-101 ADB Keyboard/Platinum *(Mac SE & Mac II)*	139.
Ergotron Mousecleaner 360°	15
MacTilt or MacTilt SE *(Platinum Color)*	68.
Farallon MacRecorder Sound System *(Mac SE or Mac II)*	145.
Impulse Audio Digitizer w/soundware	149.
I/O Design *Mac Luggage on Navy*	
Macinware Plus Carrying Case	64.
Macinware SE Carrying Case	76.
Imageware II Carrying Case	49.
HDware	54.
Kalmar Designs	
Teakwood Roll-Top Disk Cases:	
Micro Cabinet *(holds 45 disks)*	14.
Double Micro Cabinet *(holds 90 disks)*	23.
Triple Micro Cabinet *(holds 135 disks)*	32.
Kensington External Disk Drive Cover	8.
Extra Long ADB Keyboard Cable	25.
Macintosh II Stand	20.
Macintosh II Monitor Extension Cable	33.
Mouse Pocket *(Reg. or ADB)*	8.
Mouseway *(Mousepad)*	8.
ImageWriter or ImageWriter II Cover	9.
Macintosh Plus/SE Dust Cover	9.
Macintosh SE w/extended Kybd Cover	9.
Mouse Cleaning Kit w/Pocket	17.
Disk Drive Cleaning Kit	20.
Tilt/Swivel	22.
Apple Security Kit	34.
Antiglare Polarizing Filter	33.
Modem/Fax Protector 10	15.
Modem/Fax Protector 20	29.
Power Tree Surge Suppressors (10, 20, or 50)	Call
Printer Muffler Stand *(80 & 132)*	21.
Printer Muffler 80	43.
System Saver Mac *(Beige or Platinum)*	64.
Super Base	34.
System Saver SE	59.
Masterpiece Mac II	105.
New Turbo Mouse *(Reg. or ADB)*	119.
Mubius Funny Mac QT *(Beige or Plat.)*	65.
Mouse Systems A+ Mouse *(MacPlus)*	65.
A+ ADB Mouse *(Mac SE/Mac II)*	85.
Moustrak MousePad 7"x9" Size	8.
MousePad 9"x11" Size	9.
Orange Micro Grappler C/Mac GS	84.
Grappler L/Q	98.
Ribbons *Available in Black, Blue, Brown, Green, Orange, Purple, Red, Yellow, Silver & Gold*	
ImageWriter Ribbon	4.
ImageWriter Black 6-pack	20.
ImageWriter Rainbow Pack *(6 Colors)*	20.
ImageWriter II-Four Color Ribbon	9.
ImageWriter LQ Black	17.
ImageWriter LQ Four Color	20.
Seikosha Ribbon Black	6.
Silicon Comforts MacChimney *(Very Effective Cardboard Laminate Convection Cooling Device)*	16.
Smith & Bellows	
Mahogany Disk Case *(holds 96)*	30.
Sopris Softworks	
High Trek Carry Cases - Platinum Gray, Navy	
Imagewriter II Case	49.
Macintosh Plus, SE w/Standard Kybd	59.
Macintosh SE & Extended Kybd Case	69.
Targus (Canada)	
Imagewriter II Carry Case Blk	45.
Macintosh Plus Carry Case Blk.	59.
Deluxe MacPlus-XKB Blk.	65.

DataBase Management

Acius 4th Dimension	529.
4D Runtime	245.
Apple Computer HyperCard	44.
Ashton Tate dBASE Mac 1.0	295.
Blythe Software Omnis 3 Plus/*Express*	275.
Borland Reflex Plus	165.
Claris FileMaker II	Call
Ducsoft, Inc. Applications & Routines for 4th Dimension Vol. 1	86.
Fox Software Fox Base Plus	214.
Fox Base Unlimited	259.
Ideaform Hyper Book Maker	31.
MediaGenic Focal Point II	95.
Reports for Hypercard	59.
Focal Point & Business Class Bundle	55.
City To City	30.
Microsoft Microsoft File	119.
Nordic HyperCONTROL	42.
Odesta Double Helix II	339.
GeoQuery	295.
DataDesk Professional	***Special*** 295.
Park Row Incorporated	
Publish or Perish	28.
ProVUE Development OverVUE 2.1E	149.
Software Discoveries RecordHolderPlus	45.
Telegraphics Hypertutor	29.

Business Software

Abacus Concepts StatView II *(Mac+, SE, II w/68020 & 68881)*	369.
StatView SE+ Graphics	229
Access Technology Trapeze 2.1	159.
Ashton Tate Full Impact	249
Borland Eureka! The Solver	129
BrainPower ArchiText	185.
StatView 512 Plus	175.
Math View Professional	145.
DataScan	119
Bravo Technologies MacCalc	79.
Chang Laboratories	
C.A.T. Contacts•Activities•Time *Special*	229.
Claris MacProject II	395.
Cognition Technology MacSMARTS	135.
D2 Software MacSpin 2.0	189.
Informix Software, Inc. Wing2	349.
Legisoft/Nolo Press WillMaker 3.0	35.
Lundern & Associates	
WorksPlus Commands	60.
MacroPac International	
101 Macros For Excel	44.
Mainstay	
Capture	42.
Mac Flow 2.0 or Mac Schedule	115.
Meta Software Design/2.0	199.
Micro Planning Software	
Micro Planner 6.0	349.
Microsoft Microsoft Excel 1.5	249.
Microsoft Works 1.1 with Spellswell	189.
Satori Software	
Bulk Mailer 3.2	79.
Bulk Mailer Plus	195.
Components GL	385.
Legal Billing	369.
Project Billing	439.
Select Micro Systems, Inc.	
Exstatix or MapMaker	219.
Shana Enterprises	
Fast Forms	89.
Synex Mac Envelope 4.0	59.
Mac Invoice	32.
Systat Systat 3.2 *(Specify MacPlus, SE or Mac II)*	459.

Word Processors & Desktop Publishing

Access Technology Mind Write 2.0	95.
Mind Write Express	149.
Allan Bonadio Associates	
Expressionist 2.0	79.
Aldus Corporation	
PageMaker 3.0	475.
Ashton Tate	
FullWrite Professional	275.
Claris MacWrite 5.0	119.
Letraset Ready, Set, Go! 4.5	279.
Letra Studio	369.
LetraFonts *(Various Vol. 1-45 ea.)*	69.
Microsoft Microsoft Word 4.0	249.
Postcraft International, Inc.	
Laser FX	115.
Quark, Inc. QuarkXPress V2.0	499.
Silicon Beach Software	
Silicon Press	41.
Symantec More II	Call
Symmetry Acta V2.0	42.
T/Maker Company	
WriteNow V2.0	***Special*** 105.
Word Perfect Corporation	
Word Perfect	185.

Spelling & Grammar Checkers

Aegis Development	
Doug Clapp's Word Tools	42.
A.L.P. Systems	
MacProof 3.0	115.
Deneba Software	
Coach Merriam Webster's Thesaurus 2.0	36.
Spelling Coach 3.0 *(Webster's/Medical/Legal/Hyphenation)*	54.
Spelling Coach 3.0 Professional	105.
Electronic Arts Thunder! 1.23	30.
Lundeen & Associates	
WorksPlus Spell 1.1	46.
Microlytics, Inc.	
Word Finder *(Synonym Finder)*	35.
Sensible Software Sensible Grammar	55
Working Software/MediaGenic	
Spellswell 2.0	42.
Lookup *(Makes Spelling Suggestions)*	29.

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Desk Accessory Programs

Affinity Microsystems	
Tempo II	89.
AffiniFile	46.
Beyond Inc. Menu Fonts 2	32.
Borland SideKick V2.0	59.
CE Software DiskTop 3.0	28.
Deneba Software	
Comment 2.0	54.
Electronic Arts Disk Tools Plus	31.
Exodus Software Retriever	59.
Greene, Inc. HyperDialer	26.
QuickDex 1.4A	32.
Imagine Software	
Multi-User Appointment Diary with Smart Alarms	85.
Smart Alarms & Appointment Diary	35.
Mainstay Think'n Time	61.
Solutions, International Super Glue	52.
SmartScrap & The Clipper 2.0	52.
Symmetry HyperDA *(Req. 512K)*	38.

MacSnap Internal Memory Expansions by Dove Computer Corporation



It's a safe bet that no matter what Macintosh model you have, Dove Computer has a ***MacSnap*** memory expansion product that matches your needs. That's because Dove has an extensive line of high quality memory and productivity enhancement products available. All Dove products are easy to install and represent a superior value! We've selected some of the most popular models, and are offering them at special prices. All models listed include Dove's RamSnap software, their intelligent ram management software.

MacSnap 2SE ..... **475.**
MacSnap 524E ..... **265.**
MacSnap 524S ..... **409.**
MacSnap 548E ..... **585.**
MacSnap 548S ..... **649.**
MacSnap Plus 2 ..... **475.**

Graphics Software

3G Graphics Images with Impact!	59.
ABA Software Draw It Again Sam 2.0	89.
Graphist Paint II	295.
Adobe Systems Adobe Illustrator 88	325.
Adobe Fonts *(Various volumes)*	Call
Aldus Freehand	379.
Altsys Corp. FONTastic Plus 2.0	59.
Fontographer 2.2	239.
Ashton Tate Full Paint	69.
Broderbund Print Shop	36.
Casadyware Fluent Fonts 2.0 *(2-Disk Set)*	26.
Fluent Laser Fonts Vol. 1-22 *(ea)*	45.
CE Software Calendar Maker 3.0	28.
Claris MacPaint 2.0	119.
MacDraw II 2.0	309.
Cricket Software Cricket Draw	169.
Cricket Paint	129.
Cricket Graph	119.
Cricket Presents	289.
Deneba Software Canvas DA 2.0	75.
Canvas 2.0 *(Includes Desk Accessory)*	169.
Dream Maker MacGallery *(Hypercard or Paint)*	29.
Cliptures	97.
Dubl-Click Software	
World Class Fonts: Various Vol. 1-6 *(ea)*	45.
WetPaint: Various Vol. 1-16 *(ea)*	45.
Electronic Arts Studio 8 *(MacII)*	309.
Enzan-Hoshigumi USA	
MacCalligraphy 2.0	109.
Japanese Clip Art	Call
Foundation Publishing Comic People	25.
Comic Strip Factory	45.
Graphsoft Mini Cad 4.0	375.
Innovative Data Design Dreams	315.
MacDraft 1.2B	149.
Laserware Laserpaint Color II	359.
Letraset ImageStudio 1.5	279.
Ready Set Show	189.
Macromind Videoworks II	118.
Videoworks II Accelerator	125.
Videoworks II Driver for Hypercard	60.
Micro Illusions Photon Paint	179.
Micro CAD/CAM MGMStation	685.
Micro: Maps	
MacAtlas Paint 2.0 *(MacPaint Format)*	45.
MacAtlas Hyper Atlas	64.
MacAtlas Professional *(PICT/ MacDraw Version)*	129.
Microsoft Microsoft PowerPoint 2.0	249.
Olduvai Software	
Post-ART II *(4-Disk Set)* or ArtFonts	59.
Silicon Beach Software	
SuperPaint 2.0	109.
Digital Darkroom	159.
Super 3D	159.
Super 3D Enhanced *(Mac II)*	249.
Solutions International	
The Curator *(Catalog Your Art)*	79.
Springboard Certificate Maker	24.
Works of Art Assortment, Holiday, or Education	32.
Springboard Publisher	119.
SuperMac Software Pixel Paint	209.
Symmetry	
Picture Base & Wet Paint Bundle	95.
T/Maker Click Art Letters I, Letters II, Personal Graphics, Efferts, Business Image, or Holidays *(each)*	28.
Christian Images	35.
Click Art EPS Illustrations	75.
Zedcor DeskPaint 2.0	69.

MacMoney by Survivor Software



MacMoney is the user-friendly money management program for the Mac at home or in business. *MacMoney* features easy point and click transaction entry, up to 200 categories of every type of income and expense, many useful report and graph formats, plus loan and retirement planning functions. *MacMoney* prints information on ImageWriters and LaserWriters, plus lets you export your data to spreadsheets, word processors, and tax programs. Let *MacMoney* help you solve your cash management problems now.

MacMoney ..... **62.**

Disk Drives/Hard Disks/Upgrades

Appied Engineering	
MacRAMS *(1 MB SIMMS Mac+, SE, II)*	489.
AST Research	
Mac286 Co-Processor *(Mac II)*	Call
Central Point	
Central Point 800K External Drive	185.
CMS	
Compact Series SC30 *(Mac+/SE/ II)*	649.
Compact Series SC45 *(Mac+/SE/ II)*	859.
SD Series MacStack SD20 *(Mac+/SE/ II)*	569.
SD Series MacStack SD60 *(Mac+/SE/ II)*	849.
PRO-SE Series 30SE: 1 or 30SE: R	535.
Cutting Edge Cutting Edge 800k Drive	175.
Cutting Edge Wedge XL 30 Plus SCSI Hard Drive	629.
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Cutting Edge XL 30 Internal Hard Drive	505.
Cutting Edge XL 45 Internal Hard Drive	645.
Dove Computer Corporation	
68020 Accelerator Boards for Mac SE	
MSE 1 (16 Mhz)	585.
MSE 2 (16 Mhz w/ 1MB)	1059.
MSE 3 (16 Mhz w/ Math Co-processor)	779.
MSE 4 (16 Mhz w/ 1MB & Math Chip)	1255.
MacSnap 524 *(512K to 1MB)*	325.
MacSnap 524E *(512E to 1MB)*	*Special* 265.
MacSnap 524S *(512E to 1MB w/ SCSI)*	*Special* 409.
MacSnap 548 *(512K to 2MB)*	599.
MacSnap 548E *(512E to 2MB)*	*Special* 585.
MacSnap 548S *(512E to 2MB w/ SCSI)*	*Special* 649.
MacSnap Plus 2 *(MacPlus to 2MB Non Expandable)*	*Special* 475.
MacSnap 2SE or 1024 Option *(1 MB Acc. or MacII Memory Exp.)*	*Special* 475.
SCSI Interface/Port	129.
MacSnap Toolkit *(torx driver, opener & grounding set)*	15.
Everex Emac 20D *(20Mg Hard Disk)*	520.
Emac 20 Deluxe	585.
Personal Computer Peripherals	
Beige or Platinum Color. Optional Built-In Modems Available.	
MacBottom HD-21 *(20+MB SCSI Hard Disk)*	659.
MacBottom HD-32 *(32MB SCSI HD)*	699.
MacBottom HD-45 *(45MB SCSI HD)*	859.
MacBottom HD-70 *(70MB SCSI Hard Disk) Plat only*	999.
Rodime Rodime 20 Plus Ext.	629.
Rodime 45 Plus *(Ext. 45MB SCSI)*	939.
Rodime 450RX *(Int. 45MB Mac SE/ II)*	829.
Rodime 100 Plus *(Ext. 100MB SCSI)*	1169.
Rodime 140 Plus *(Ext. 140MB SCSI)*	1319.
Rodime 1000 RX *(Int. 100MB MacII)*	1045.

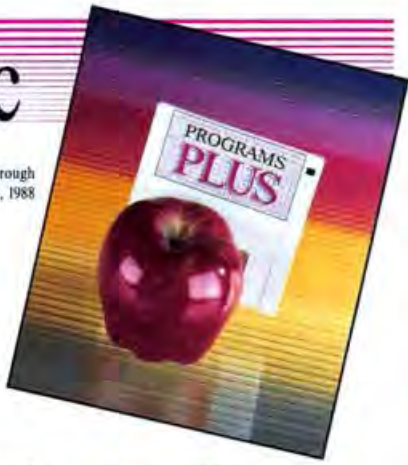
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C•A•T ..... **229.**

to Polish Up Your Mac



Specials good through
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Game Software

Access World Class Leader Board Golf	34.	Firepower	16.
Accolade Hard Ball	23.	Universal Military Simulator	30.
4th & Inches	24.	Might and Magic	37.
Artworx Bridge 5.0	22.	Sky Travel	45.
Avalon Hill Mac Pro Football	30.	**Microsoft** Flight Simulator 1.02	32.
Baudville Award Maker Plus	29.	**Micro Sports** MSFL Pro Draft	26.
Broderbund Ancient Art of War or Ancient Art of War at Sea	27.	MSFL Pro League Football or 500 Great Teams	32.
ShufflePuck Cafe or Ultima III	24.	**Miles Computing Inc.** Down Hill Racer	24.
Poster Maker Plus	39.	Harrier Strike Mission II or The Fool's Errand	27.
Bullseye Software Ferrari Grand Prix	32.	**Mindscape** Balance of Power 1990, Crossword Magic or Citadel	30.
P51 Mustang Flight Simulator *Special*	32.	Deja Vu: A Nightmare Comes True	30.
Centron BlackJack Ace *Special*	28.	King Of Chicago or Shadowgate	30.
Crapsmaster or Roulettemaster	28.	Defender of the Crown, Colony or The Uninvited	30.
Electronic Arts Ogre	20.	**Practical Computer Applications**	
ChessMaster 2000	28.	MacGolf or Lunar Rescue	35.
Chuck Yeager Flight Simulator or Life & Death	36.	MacCourses	34.
Starfleet I	37.	Road Racer	45.
Scrabble	27.	Mac Golf Classics	59.
One-On-One, Pinball Construction Set, Seven Cities of Gold, SkyFox, or Patton vs Rommel	15.	**Primera** Smash Hit Racquetball II	21.
EPYX Sub Battle Simulator	30.	**Sierra On-Line** Leisure Suit Larry	23.
Greene, Inc. Crystal Quest	27.	Space Quest or Space Quest II	30.
Crystal Quest w/Critter Editor	42.	Police Quest	30.
Hayden Software Sargon IV	29.	**Silicon Beach Software**	
H.J.C. Software, Inc.		Dark Castle or Apache Strike	27.
Air Traffic Control Simulator	35.	Beyond Dark Castle	27.
Infinity Software, LTD.		**Sir-Tech** Mac Wizardry	35.
Go or GrandSlam Tennis	27.	**Sphere, Inc.** Tetris	23.
Infocom Leather Goddesses of Phobos	24.	GATO, Orbiter, Falcon, or Pt-109	26.
Beyond Zork, Zork Trilogy or QuaterStaff	30.	Solitaire Royale	19.
Hitchhiker's Guide to The Galaxy	18.	**Studio Zero** Orbital Mech	35.
Zork Zero, Show Gun or Journey	42.	**XOR Software** NFL Challenge	64.
MediaGenic Shanghai or Jinxter	24.	Pro Challenge or Basketball Challenge	30.

Read-It!!! O.C.R. by Olduvai



Read-It!!! O.C.R. is the fully trainable, software only, optical character recognition solution. Use *Read-It!!! O.C.R.* with any scanner, including Thunderscan, to input books, magazines, reports or any other text document you desire into your Mac. *Read-It!!! O.C.R.* converts scanned documents into editable text that you can place in your word processor, database, or desktop publishing package. *Read-It!!! O.C.R.* requires a MacPlus (or later) with 1 megabyte of RAM. *Read-It!!! O.C.R.* now offers speech drivers for many popular scanners and EasyLearn, the super fast way to teach *Read-It!!! O.C.R.* new fonts.

Read-It!!! O.C.R. ..... **199.**

Blank Media

Single Sided 3½" Diskettes		Sony 3½" DS/DD Disks *(box of 10)*	18.
Bulk *(Sony)* 3½" SS/DD Disks *(10)*	12.	Fuji 3½" DS/DD Disks *(box of 10)*	19.
Sony 3½" SS/DD Disks *(box of 10)*	13.	Maxell 3½" DS/DD Disks *(box of 10)*	20.
Double Sided 3½" Diskettes		Verbatim 3½" DS/DD Disks *(box of 10)*	19.
Bulk *(Sony)* 3½" DS/DD *(10)*	17.	3M 3½" DS/DD Disks *(box of 10)*	20.
Centech 3½" DS/DD Color Disks *(10)*	19.		

Languages

Borland Turbo Pascal	65.	**Microsoft** Microsoft Quick Basic	74.
Turbo Pascal Tutor	45.	**Smethers & Barnes** Prototyper	74.
Consulair Mac 68000 Dev. System	59.	**Symantec** Lightspeed C	95.
Mainstay V.I.P. 2.5		Lightspeed Pascal	65.
(Visual Interactive Programming)	109.	**T.M.L.** TML Pascal II *(Includes MPW)*	79.
Manx Aztec C	69.	TML Source Code Library II	49.
Aztec MPW C or SDB	105.	**Zedcore** ZBasic 5.0	119.

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Acknowledge (SuperMac). One of the next generation of terminal emulators, Acknowledge is a cross between a terminal program and a programming language. Its capabilities go far beyond even the most powerful scripting language, allowing you to create your own completely customized terminal programs using TAL, the Telecommunications Access Language. Acknowledge comes with a run-time module, and licensing is available for distribution of your custom connections.

FileMaker II (Claris). Recently acquired from Nashoba, the former FileMaker 4 has a new name that's sure to cause confusion for a while. FileMaker is an excellent flat-file database manager for those simple databases not requiring the power of a full-scale relational database program. Good use of the Macintosh interface makes FileMaker II easy to use, both for designing databases and layouts and for data entry and retrieval.

Symantec Utilities for Macintosh (Symantec). While picked and discussed at length in October, SUM is such an excellent value and so worthwhile that it deserves emphasis. Built on the skeleton of MacZap, SUM is an excellent set of utilities that can save your data in the event of catastrophe (or stupidity). It doesn't relieve you from the responsibility for backing up your data, but when used in conjunction with a good backup program it can make your data much safer. Buy it, and use the Guardian feature.

Word (Microsoft). The pick you never thought you would see. It took a couple of iterations, but Word version 3.02 finally repairs the bugs of the initial release and it turns out the program is a good workhorse word processor (and, in fact, was used to write this column). Previews of Word 4.0 show it to be very impressive and indicate that Microsoft has been listening to the complaints of Word users and addressing them. If Microsoft can avoid the buggy disaster of 3.0 on its first release of 4.0, Word may yet emerge as the big winner in the word-processor wars.

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Information, Please

We're constantly flooded with more data than we can comprehend. The trick is to turn it into useful information.

Facts, it has been said, are stupid things. As are numbers. But we're still addicted to them. We analyze them, generate them, archive them, and turn them into graphs, charts, and other visual images that make it easier to share them with others. Thanks to the ubiquitous spreadsheet, we play endless "what if?" games with them. But do we really understand them?

Consider: If a three falls in a forest and nobody hears it, is it data or is it information? Let me put it another way: Close your eyes and picture three. Not the character three. Not three dots on a die. Not three blind mice. Picture the concept of threeness.

If your right brain is pulling its weight, you might be able to pull off this little exercise. OK, mister smarty-pants, now try visualizing the concept of ninety-seven. No, wait, I'll make it a little easier — forty-two. Seventeen?

Face it: Numbers just aren't intuitive concepts for most of us. Numbers are data. They need a context, a meaningful mode, if they stand any chance of being transformed into information.

The Mac is ideally suited for turning numbers into information. The Mac interface allows — encourages — graphics at every stage of the game. From folders on the desktop to the Clipboard to dialog boxes, the Mac philosophy has always been that an icon is worth if not a thousand, at least several dozen words. Even in word processing, the Mac added a whole new emphasis on typo*graphics* — not just type — both on the the screen and in your output. Multiple styles, sizes, and typefaces can enhance your textual information with worlds of nuances, without adding words.

Once you've got your data at hand, there are plenty of places to put it. Our MacUser Labs report this month compares seven relational databases. But there's no point in going to the trouble of storing up all that data unless you can get some use out of it. Many of the latest languages and tools for applying artificial intelligence to your data are now available on the Mac. The most accessible of these are geared towards

BY JON ZILBER

CARTER DOW

developing expert systems. An expert system is a program that observes how a human expert responds to a series of situations and that attempts to extrapolate and generalize rules from those responses that it can apply when the human expert hands over the reins. Dan Shafer's article on expert systems surveys the state of commercial packages for developing expert systems on the Mac. If none of these fit the bill, check out Dan Rasmus's article on other tools of artificial intelligence.

A wide variety of other tools are available for analyzing data. Many of these require thinking about data — numbers, in particular — in new ways.

THE NUMBER OF THE BEAST

What a wondrous thing a number is. And what a confusing thing. Numbers are the format for most user-generated and user-analyzed information. However, most number crunchers are locked into one particular way of approaching their data — spreadsheets. Spreadsheets are good, spreadsheets are great. But spreadsheets aren't the only way to add value to and process your data. Sometimes you want better exploratory tools, different kinds of analysis, different presentation, different context, and different hooks into other applications. When the only tool you have is a spreadsheet, the whole world looks like a two-dimensional array. Maybe it's time to look into some new additions to your analytical toolbox.

One of the fundamental limitations of spreadsheets is that they encourage the user to assume that the data in each cell is accurate. Spreadsheets churn away with six-decimal precision, with a philosophy of "Who needs accuracy when you've got precision?"

Welcome to the real world of confusion.

TREE CHEERS

Numbers are not the goal. Information is not the goal. Decisions are the goal. The point of it all is to make decision making easier and better. The decision might be whether to build a new factory, install energy-saving equipment, or pay the electric bill. If the decision is a straightforward matter of

Blind Data

Data leads a double life. Sometimes it's for analysis, sometimes it's for presentation. Although these two kinds of data may be similar, they're not quite the same — like identical cousins.

Data for analysis has an audience of one: the person looking at it. Data for presentation has an audience of many: all the people whom the analyst expects to see it.

Data for analysis is best when it's pared down to numbers and shapes alone; most of the context — the information about the information — is carried in the analyst's head. The analyst is looking for patterns, and patterns are obscured by detail. The patterns might be linear trends, three-dimensional shapes, clusters, or any of a dozen other types. The analyst must be prepared to find any one of them. After she has found a pattern, though, she must look at the elements in the data that cause the pattern, and discover whether the pattern is real and interesting. At this point, all the background information must be available to make the pattern's meaning clear.

The good analyst carries most of the background information in her mind, and uses it to test the patterns as she analyzes. The situation for presentation is the reverse. All the relevant information must be instantly available. A person looking at the data from a new context must be able to see what it means before she can do anything with it. That means that all the information necessary to understand the data must be printed right there on the page with the data, or must be immediately accessible from the screen that is displaying the data.

And data presentation is not limited to presentation to other people: You may want to look at the data yourself in six months, and there's a good chance you won't remember what you did. Which means that when you're storing data, you must also store information about the data.

Here are a few tips to help you with each half of data's split personality.

For analysis:

- Many different programs exist to help analyze data. Few of them give you a chance to understand the background of the data. Always find out as much as you can about who collected the data, where it was collected, what time period it covers, what was studied, and what the viewpoint of the data collectors was. If you have a different data set you can compare with the one you're using, do so; tracking down the reasons the two sets differ will give you valuable insight into what your data set means. And you can often find errors that might have thrown your analysis off. For example, using data collected once a year to project weekly trends is a no-no.

- Once you have all the information in your mind, use a program that lets you hide as much of it as possible. Programs generally let you put the information back in as necessary, but you need to keep from distracting yourself with preconceptions.

- Consider what techniques you want to use depending on what data you have. John W. Tukey's techniques of exploratory data analysis are helpful if you don't know where to start. Let the data tell you what it shows.

For presentation:

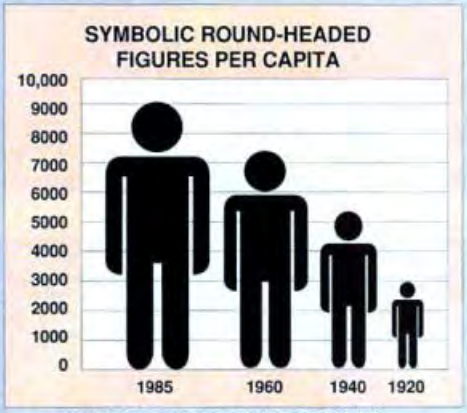
- Put all the information you can into the display. Always remember that tables and graphs get copied out of context. If you want to convey information, it must be present in the output.

- Remember your audience. Someone is going to read this, even if it's only your boss. The presentation must be aimed at somebody.

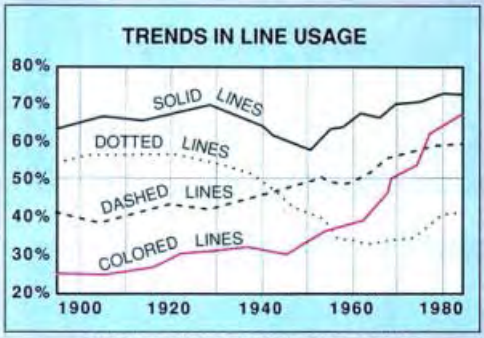
- Avoid the "Eureka!" problem. The display you see the answer in for the first time will probably not convey that answer to others who have not looked at all the earlier displays you have generated. Think carefully about the best way to show what you have discovered and then use that method. In general, tables are good for quantitative results, charts and graphs for qualitative.

- Always think about what you would have wanted to know about the data before you started analyzing it, and make sure that information is available to those who are going to follow your analysis.

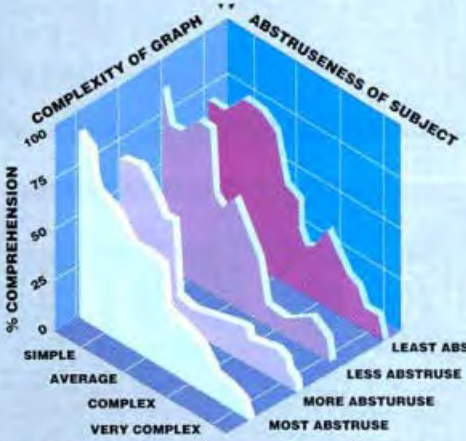
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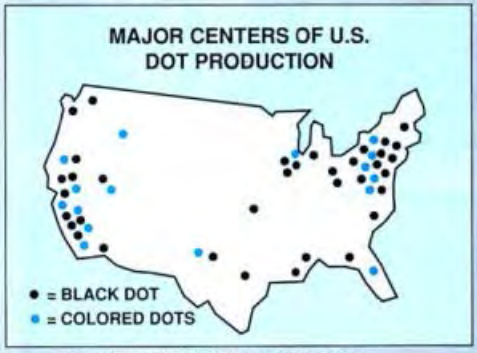


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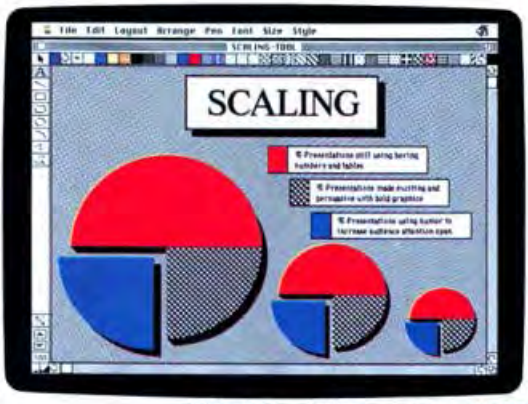
Graphic presentation is often the key to turning data into information. But a pretty picture isn't worth a thousand numbers if the analyst hasn't done his job ahead of time, as analyst Tom Weller demonstrated in his book *Culture Made Stupid*, in which he notes that "Statistics, however, fraudulent or irrelevant, lend an air of authority to any argument. When embodied in a graph or chart, they become even less comprehensible, and therefore more convincing."









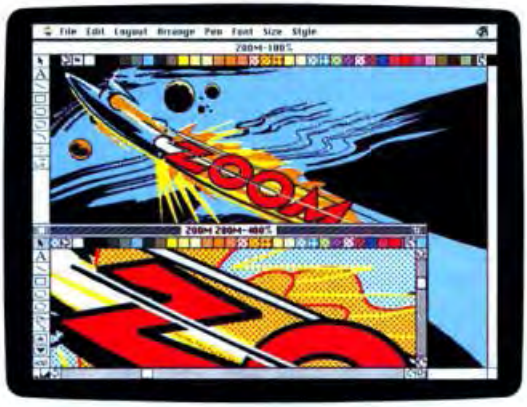




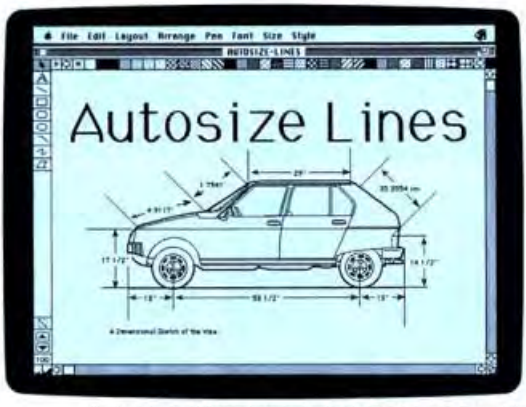
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dollars and cents (is there enough money in the account to pay the bill?), a spreadsheet will do just fine. But decisions often involve probabilities and the element of chance. Sometimes there are unknown variables, and sometimes the problem is that there's such a flood of data that you can't focus on the critical factors.

One of the simplest tools you can turn to is decision-tree analysis. If you find yourself in Las Vegas, paralyzed with indecision in front of a one-armed bandit, a simple decision tree can help you decide whether to put yet another quarter in. A friend in the casino tells you that the machine pays off $10 every 100 plays (on the average) and pays off $100 every 1,000 plays. You could represent your situation using a simple tree with three branches. For each play, there's a 1 percent chance of a $10 payoff, a 0.1 percent chance of a $100 payoff, and a 98.9 percent chance of a goose egg payoff. The average result, mathematically, is (1 percent times $10) plus (0.1 percent times $100) plus (98.9 percent times $0), which comes to 20 cents. Of course, you never actually get a 20-cent payoff; this "expected value" is an abstract mathematical entity, like the mythical half child in the average family of two-and-a-half children. You could hit the jackpot on the first quarter. But it does tell you that, over the long run, your 25-cent investment only pays off 20 cents. The so-called "rational man" would decide not to play.

This doesn't necessarily mean that *you* shouldn't play. If you get five cents' worth of thrills out of each play, the scales balance. And you might value a lump sum of $100 differently than you value $100 worth of quarters. This is one of the reasons why people play state lotteries more when the jackpots rise. The average payoff per player isn't any better when the prizes grow — the payoff is bigger, but the odds against winning are smaller, since more people are playing. But a lottery represents the only chance most people have of quantum leapfrogging into the Robin Leach set. The views of the "rational man" don't always weigh heavily in the decision.

Tree Age Software has developed a program called Decision Analysis by Tree Age (DATA), due out by the time you read this. DATA guides you through the creation of decision trees (and verifies that you're not missing branches). It also calculates expected values, compound probabilities, and payoff values; helps identify the optimum path on the tree; and performs related analyses of the data. For more examples of how decision trees work, see the sidebar "Decisions, Decisions."

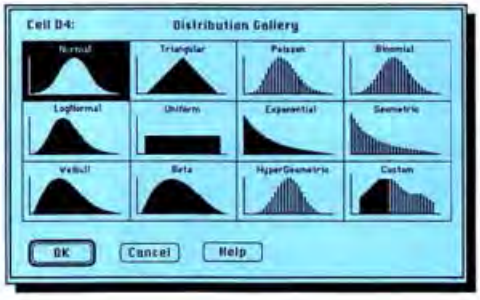
MASTER THE POSSIBILITIES

Albert Einstein may have been the father of modern physics, but he wasn't entirely happy with all his offspring. He was adamantly opposed to one of the underlying principles of quantum physics: that some physical events are, fundamentally, random. "I shall never believe that God plays dice," he insisted. However, he would have been the first to admit that the more mundane events on the larger scale of human enterprises are not always entirely predictable.

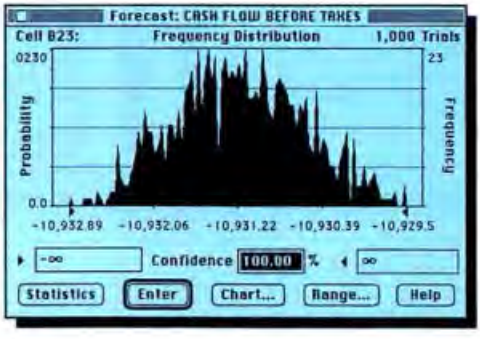
The spread of spreadsheets can lead to a false sense of security, but real-life data are rarely as precise as 1-2-3. Sometimes a probabilistic approach is called for, such as Monte Carlo simulation.

The name derives from the famous casino, where chance and the law of averages are the name of the game. Crystal Ball, from Market Engineering, is a Monte Carlo simulation program that uses the same principles to incorporate probabilities into the analysis of real-life situations. A spreadsheet-like model is developed (in Excel, for example) to simulate your situation. The twist is that instead of putting exact numbers into all the cells, you assign probabilities to key variables. These probabilities represent the chance that these variables will fall within a specified range of values. You can use standard probability distributions (like normal, binomial, and exponential distributions) or customize a distribution of your own.

Based on these probabilities, the program substitutes specific values for each variable, and calculates the results, based on the equations in the



In a Crystal Ball model, random access takes on new meanings. Instead of hiding your uncertainty behind a spreadsheet full of numbers, you can certainly state with certainty a certain kind of uncertainty. Crystal Ball variables can adopt any of these standard probability distributions, or you can draw a customized distribution.



This forecast shows the composite results of 1,000 trials of a particular model. Although the average result is roughly in the middle, any single result is more likely to fall either a little high or a little low of that average.



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Compact, the Cambridge Z88 portable features a slim design that *weighs under two pounds. The size of a piece of paper (8.25" x 11.5"), the Cambridge Z88 is less than an inch thick.* Other portables are as big as a briefcase; the Z88 fits into one!



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spreadsheet model. These initial results represent a possible outcome — a reasonable guess, but not much more. But when you repeat the process a few hundred or a few thousand times and average the results, the aggregate outcome takes on a higher degree of statistical significance. That is, it creates a scenario that shows the likely range of outcomes, rather than a single value.

And, even better, you can plot all these trials to get a graphic picture of the results. Crystal Ball also makes it easy to conduct what's called "sensitivity analysis." No, that's not a kind of psychotherapy reserved for the cast of *thirtysomething*. Sensitivity analysis refers to techniques that show you which variables have the greatest impact on the results. The idea is that before you spend time and money worrying about refining certain data points, you can see whether changing those data would make much difference in the outcome. By running a new simulation in Crystal Ball, you can see whether changing certain probability distributions and assumptions will affect the big picture.

For example, suppose you're projecting sales of your new Wonder Widgets. You've made some assumptions about your costs, margins, overall economic conditions, and expected sales, and are trying to project profits for the next quarter. Your vice president of finance is concerned about the possibility that interest rates will rise, increasing the cost of borrowing capital and thereby increasing manufacturing costs. The financial wizards can't tell you exactly what interest rates will be. They say that rates are likely to be around 12 percent; they could easily be more, but probably won't be less. You make interest rate a variable, instead of a fixed number, coming up with a probability distribution that peaks at 12 percent, tapering off rapidly for numbers below 12 percent but staying fairly high for numbers above 12 percent. The model shows that, with this scenario, Wonder Widgets will almost certainly be profitable. But one of your accountants is more worried about interest rates. He thinks they're equally likely to be between 12 percent and 18 percent, with little probability that they'll be much outside that range. You come up with a new probability distribution reflecting this scenario, and run the model again. If the results show that there's more of a downside risk, interest rates are an important variable to keep an eye on; if the results are about the same, you can tell the accountants not to worry.

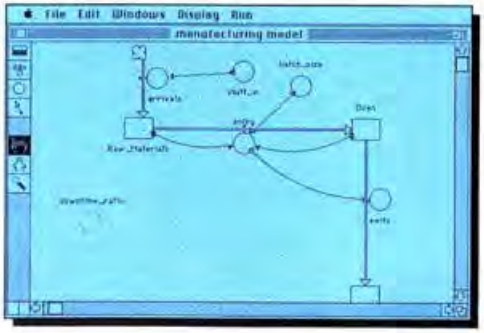
In other words, Crystal Ball adds a healthy dose of *un*certainty to your "what if?" scenarios, removing the artificial confidence that comes with six-decimal-place spreadsheet calculations. A little uncertainty can make your data more meaningful, helping you separate the possible from the probable. And, as another great thinker, Sherlock Holmes, once noted, "When you have eliminated the impossible, whatever remains, *however improbable*, must be the truth."

CONCEPTS, WHAT A REALITY

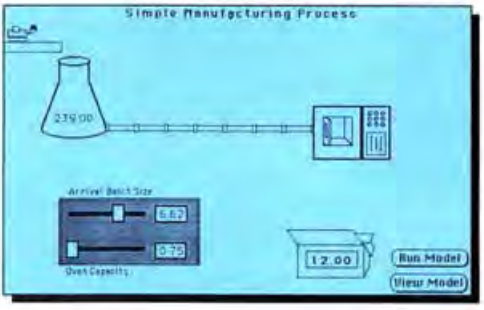
Simulation and modeling tools bring it all together — number crunching, interactivity, ease of use — all making excellent use of the Mac's graphic capabilities for visual input and output, and making the model easy to use for the model builder as well as other users.

The universe consists of two types of entities: matter and energy. Thanks to our friend Einstein, we now know that both are fundamentally the same stuff. In a model simulating your own little corner of the universe, two other types of entities — objects and processes — become intimately partnered.

Let's go back to the Wonder Widget factory. You might create a model to simulate the manufacturing process. The raw materials and the finished widgets are objects that get exposed to various processes at workstations along the manufacturing assembly line. You can specify all the relevant operating parameters — temperatures, speeds, weights, mixtures — associated with each object or process, as well as formulas that describe how each step is connected to the other steps. But that's just one possible model. You could just as easily model your



STELLA lets you model complex events or processes, such as this manufacturing cycle.



The same model is given a graphic facelift, using the forthcoming HyperCard front end for STELLA.

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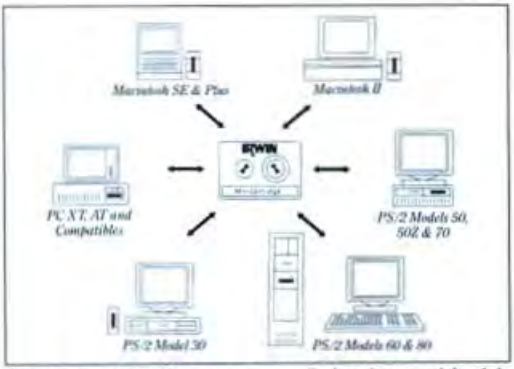
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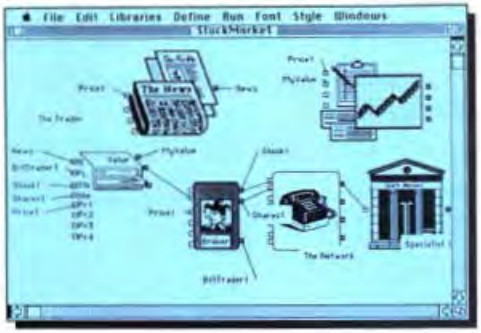
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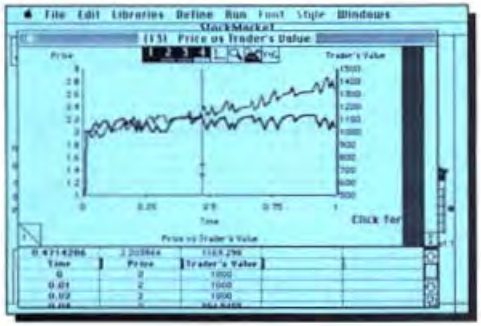
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When you set the model in motion, the output is typically a graph showing how two or more factors are related. By changing the parameters or the relationships between steps, you can find how best to use your resources. And the interactive nature of the simulation — changing a parameter or a relationship gives you instant feedback on how that change affects the rest of the model — is designed to provide the user with a more intuitive feel for what's going on than a spreadsheet could provide.

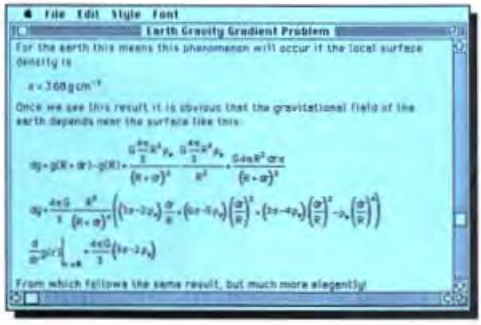
There are two leading modeling packages for the Mac: STELLA and Extend. STELLA for Business from High Performance Systems was re-



In Extend, you can import graphics right into the model's interface. This model shows how computerized trading, brokerage commissions, and other market parameters affect Wall Street.



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Milo does for symbolic math what fonts and styles do for type. These expressions can easily be entered, rearranged, and evaluated. But you still have to figure out what it means by yourself.



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viewed in our June '88 issue. STELLA's younger brother, STELLA for Education, is priced and documented for academic applications (that is, lower price and more documentation than STELLA for Business). High Performance Systems is also developing a HyperCard front end for STELLA that may be out by the time you read this. HyperCard adds more graphic and animation flexibility to STELLA models.

The other package is Extend, from Imagine That. Extend comes with more built-in graphic display options than STELLA, with several libraries of functions tailored for scientific and business applications, including engineering, finance, and statistics. Extend also includes a compiled scripting language but, as with HyperCard, you can develop applications without writing a line of code.

MATH APPEAL

Despite all these warm and fuzzy intuitive facades, there's no escaping the mathematics that lie behind each of these packages. You'll still have to come up with the mathematical expressions that relate each item in the model, simulation, or decision tree. If the math gets complex, you'll appreciate tools like Mathematica (reviewed in our November '88 issue) and Milo.

Milo, due out by now, is the long-awaited math processor from Paracomp. At one point, Apple reportedly was considering licensing Milo and implementing its routines in ROM, putting its symbolic math capabilities alongside the Mac's graphics and text routines.

Although Milo has some extensive number-crunching capabilities, its real value is its ability to manipulate symbolic mathematics. Milo can take an algebraic, trigonometric, or calculus expression and expand, simplify, or reduce it to a more useful form. For example, a simple algebraic expression like $x(x+1)$ can be converted to the equivalent form x^2+2X or vice versa. Milo can also apply standard and customized rules to more complicated expressions — like matrices, derivatives, and series — to manipulate them with a single keystroke. Milo can just as

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easily turn these expressions into simple graphs. You can also use text strings instead of single-letter variables. So instead of writing $E=mc^2$, you can write Editing=manuscript x corrections^2.

However, as Milo's manual points out, the program doesn't "know" math any more than a word processor "knows" literature; Milo requires the cooperation of a math-literate user. Milo's end of the bargain is to make it easy to create a complicated math document and to perform standard symbolic manipulations instantly — providing what one Milo fan calls a mathematical joystick — and without the possibility of a slip of the pencil. (Incidentally, the name refers to the main character in the classic mathemagical fantasy *The Phantom Tollbooth.*)

If you're not afraid of a little more math, there are lots of other tools out there. Linear programming (which has nothing to do with computer programming) is a set of techniques for finding the best way to allocate your resources in a wide variety of applications. A typical linear-programming problem might involve looking at the raw materials available to you, the materials required for each product you make, and the profitability of each product, with the objective of finding the most profitable mix for your product line. Spreadsheets are designed to let you ask, "what if?"; the goal of linear programming is to tell you "what's best."

Appropriately enough, What'sBest!, from General Optimization, is the name of a new linear programming import from the MS-DOS world. There are three versions of What'sBest!: Personal, Professional, and Industrial. The personal version is aimed at small, single-user applications, while the Professional and Industrial versions can handle much larger models.

Another linear-programming package is Best Answer, developed by Market Engineering (the people behind Crystal Ball) and distributed by Heizer Software Exchange. Best Answer and all three versions of What'sBest! require the use of Excel to develop and crunch the models, and What'sBest! also requires HyperCard 1.2.1 to install the application.

VITAL STATISTICS

You don't have to be a statistician to use stats programs, but it helps. However, several programs make great strides toward making statistics more accessible to a larger audience. Some take an exploratory approach to statistics, suggesting which measure and correlation you might try pulling out of their statistical bag of tricks, based on a preliminary analysis of the data. They use two- and three-dimensional graphic displays that you can rotate and view from any angle to show you what it all means.

StatView II and StatView SE+ Graphics are new versions of the popular StatView 512+ package. They add features for creating presentation graphics (in color, in the case of StatView II). The original StatView 512+ is still sold by BrainPower, while SVII and SVSE are distributed by the developer, Abacus Concepts. The situation is a little confusing, owing to ongoing contractual obligations between Abacus and BrainPower. When you buy one of the new StatViews from Abacus, a complete copy of the original SV512+ manual and program disk is included in the box along with either SVII or SVSE. In a slip enclosed in the box, Abacus straight-facedly recommends reformatting the StatView 512+ disk "for use as a backup diskette." BrainPower, however, continues to sell and support the original SV512+ program, which has the advantage of running on a 512K machine, as the name suggests. (StatView II was reviewed in our October '88 issue; StatView 512+ was reviewed in December '86.)

There's also a new version of Mac-

Decisions, Decisions

Decision trees can shed light on where you should concentrate your fact-finding and fact-refining efforts, by showing you where you can increase your expected value the most by reducing your uncertainty. For example, you're planning a vacation trip and have narrowed the options down to London and Honolulu. London is your first choice. After much soul-searching, you decide that you'd enjoy London three times as much as Honolulu, but only if it doesn't rain. You'd prefer Honolulu in the sun twice as much as London in the rain, and you wouldn't like Honolulu in the rain at all. You translate this into dollars by saying that a sunny London vacation would be worth $3,000, a sunny time in Honolulu worth $1,000, a rainy trip to London worth $500, and a rainy week in Honolulu would be a washout.

You guess that there's an 80 percent likelihood that it will rain in London during the time you plan to go, but only a 10 percent chance that it will rain in Honolulu. You can summarize the situation with the tree shown in the figure.

It tells you several things. First, London is your best bet. But the expected value of a week in London is only $1,000, so that's the most the hypothetical "rational man" would shell out for the trip. On the other hand, if there were some way to get better weather forecasts (or a travel agent willing to give you a money-back guarantee if it rains), you could increase the expected value quite a bit. That is, if you could know for sure when it would rain in both cities, it could be worth several hundred dollars to get better data. So a decision tree can also tell you where it makes sense to expend your resources to get better information.

You could conduct this analysis in a spreadsheet, but a decision tree lends itself to a more visual, intuitive approach. And sometimes the process of creating the tree can be a benefit in itself, forcing you to quantify variables (like how you feel about Honolulu and London). Perhaps you've avoided making some decision because it involves factors you thought were unquantifiable; the decision tree approach might show that those factors don't really make much difference in the expected value.

Decision trees have problems when one or more of the potential payoffs are infinite — like the possible benefits of making contact with extraterrestrial lifeforms versus the cost of the research for what might be a fruitless effort. So you may only be able to use this approach to model one piece of your situation, and input the results into a larger model using another analytical technique.

Spin, from D2 Software (see June '86). In MacSpin, you can view data points in a 3-D scatter plot that you can rotate in any direction. Watching your data spin can literally give you a new perspective on the meaning of it all. MacSpin 2.0 adds improvements in the user interface (variable rotation speed, color, window tiling and stacking), as well as some new analytical and presentation features.

DataDesk Professional (reviewed in November '88) from Odesta takes a similar approach, which lets you see several different views of the same data simultaneously — perhaps a scatter chart, a pie chart, and a histogram. When you select the data in one view, it's highlighted in all the others; when you change it in one window, all other windows adjust accordingly. Once you have a feel for the data, you can turn to the pop-up menus that suggest which statistical analyses you should run to get some quantitative benchmarks.

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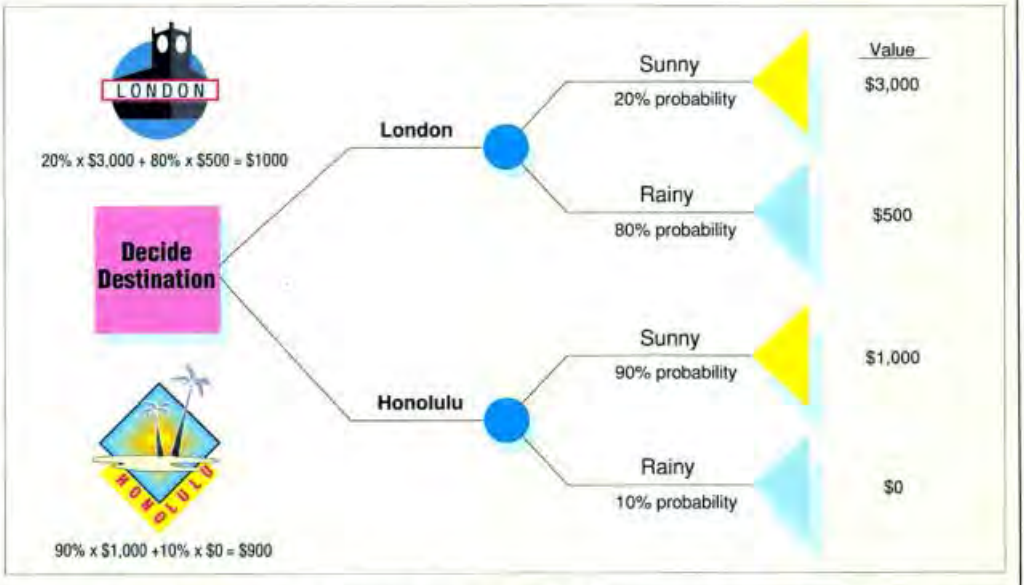
Normally, the numbers come first, and the job of the information analyst is to turn numbers into graphical information. But sometimes, the process takes place in reverse.

DataScan is a new application from BrainPower that takes an existing graph and extracts the underlying numbers. The concept is simple: scan a graph (or sketch it in a painting program), open up that file in DataScan, and enter numerical values to establish the scale of the graph. DataScan then produces a table of values for every point in the graph. Finally, you can export this table into the number cruncher of your choice for further analysis. DataScan has some limitations (aside from the need for a scanner). It works only on certain types of graphs — like scatter and line graphs — and requires you to touch up the scanned document to put the axes and tick marks into a standard format. It can handle graphs with more than one line, although the situation gets a little complicated if the lines intersect. But if you've ever fussed with manually reading data points from a curve, you'll appreciate the time DataScan can save.

THE DATA GAME

In the face of all this competition from other tools, you can expect spreadsheets to gear up for a new assault. With Ashton-Tate's Full Impact just released and Informix's Wingz around the corner, you can expect Excel 2.0 to come back fighting with buckets of new features.

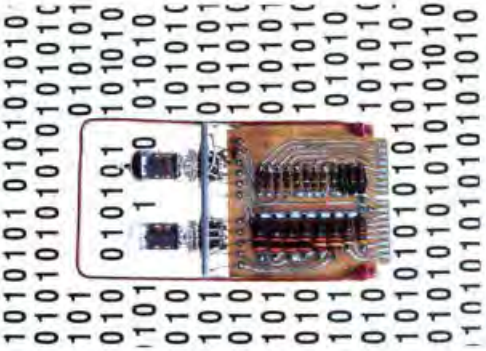
And the field isn't limited to the heavyweights. Sometimes the smaller players are the most innovative. Keep an eye out for radically new spread-



What's it gonna be: aloha Honolulu or a foggy day in London town? This decision tree summarizes the possibilities and shows what the most "rational" choice would be. If you opt for London, there's a 20 percent chance of getting $3,000 worth of fun, but an 80 percent chance that rain will wash the value down to $500. So the "expected value" for London comes out to $1,000, while the expected value of a trip to Honolulu is $900. All other things being equal (which they never are), London looks like your best bet.

MARK W. SWEENEY

Information, Please



This is a bit. Specifically, it's a bit of history. This is a Bendix bit, a storage device for holding one 1 or 0. Way back when, one bit cost a heck of a lot more than two bits. Now they're a dime a megadozen. If it weren't for these guys, we wouldn't have to worry about all this information.

Bendix bit courtesy of the John J. Anderson Archives and Wayback Machine.

sheet interfaces, with an emphasis on using graphics for intuitive interaction and improved presentation options, customizability, and hooks into HyperCard. The rigid two-dimensional grid won't be the only game in town.

Data comes in many forms. Graphic artists use the Mac to store libraries of clip art, scanned images, and other items in visual databases. Musicians store sampled instrument sounds, effects, and patch libraries in specialized databases. In computer-aided design systems like VersaCad, it's not unusual to treat a single complex schematic drawing as a database unto itself, with each subunit corresponding to separate records. For example, a diagram representing a computer logic board might call upon records that store all the pertinent information for each of dozens of microprocessor chips and other components.

You may even have a database without knowing it. A hard disk full of word-processing documents doesn't fit the conventional notion of a database. But add GOfer, a new desk accessory from Microlytics, and presto! You've got yourself a free-text database. GOfer can search a file, group of files, or an entire hard disk to find every instance of a specified word. You can broaden the search by asking GOfer to look for close matches to the target (to include variations on the root word or typos), or you can narrow the search by specifying combinations of words or by making the search case sensitive. GOfer can automatically generate a file containing each match, including a few lines to show the context for each match.

Perhaps the ultimate database is out there in the wide world of telecommunications services. It's a database that runs on the biggest network there is — the telephone network — using the most advanced MultiFinder-compatible parallel processors available: you and me. Whenever you access the world of bulletin boards, CompuServe, GEnie, and MCI Mail, you become part of an extended database of fellow Mac users. When you log on, you have the unique experience of becoming both data and processor, both user and database administrator.

And, if we all really work at it, maybe we can get ourselves out of beta test.

A FAN OF "THE PRISONER," JON ZILBER IDENTIFIES WITH #2'S RELENTLESS DEMAND FOR "INFORMATION." UNFORTUNATELY, HE ALSO IDENTIFIES WITH #6'S RESPONSE: "YOU WON'T GET IT."

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PETER A. GOULD



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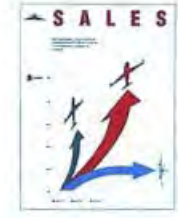
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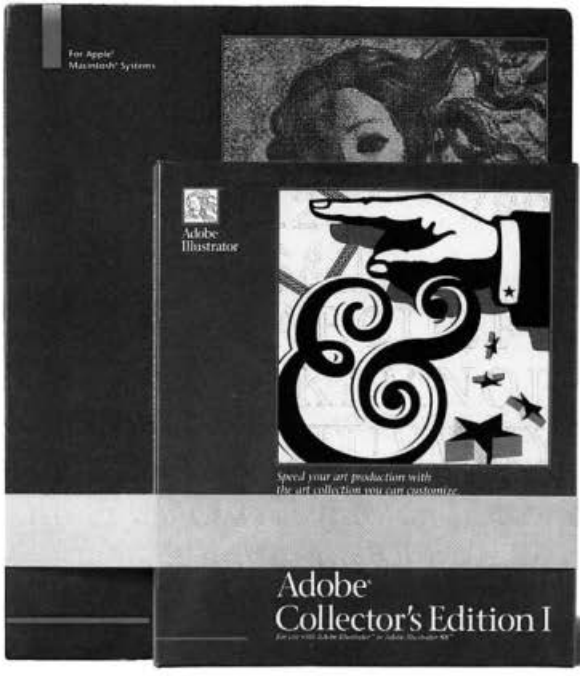
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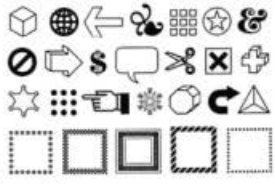


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Artificial Intelligence from A to I

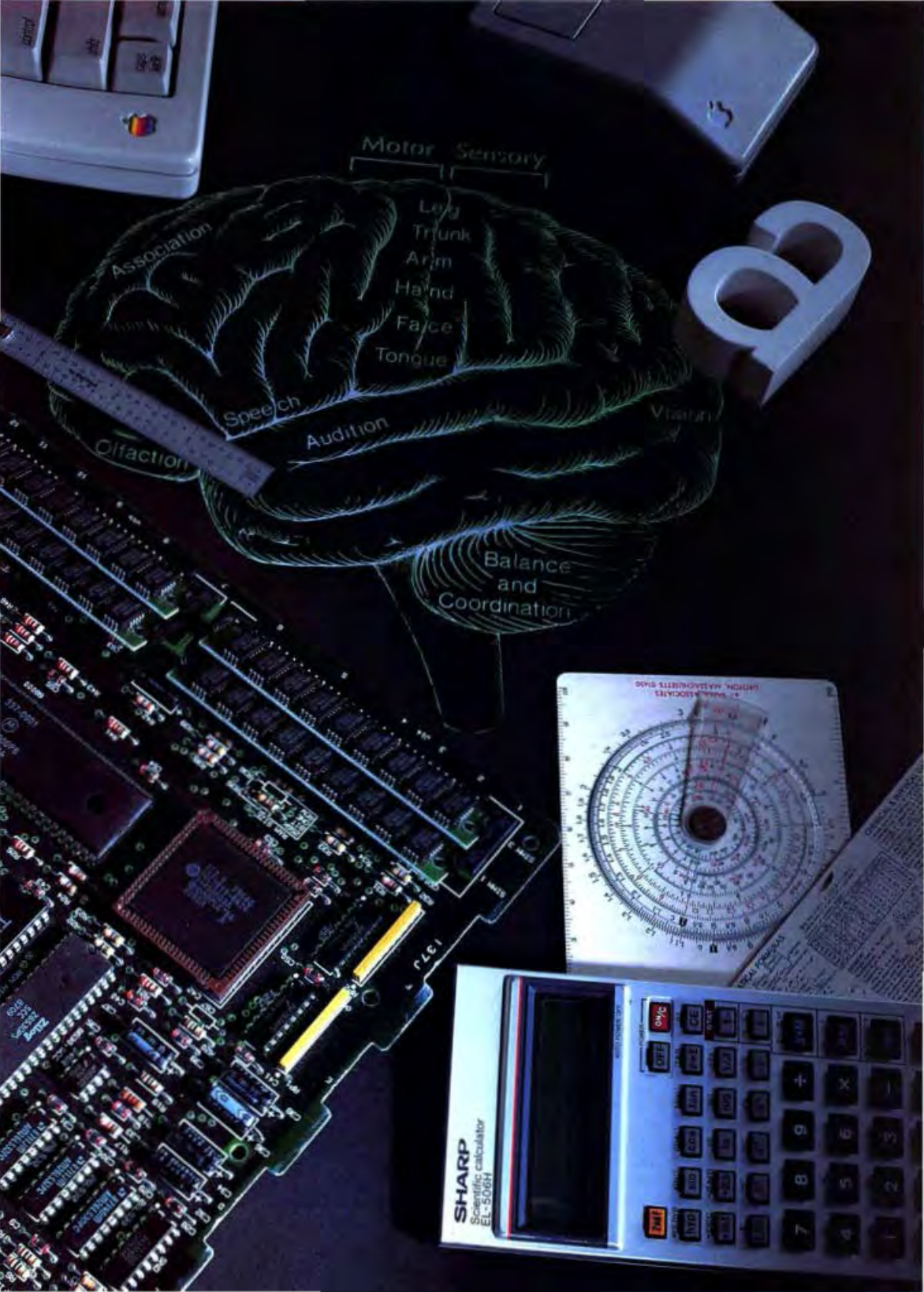
"As poet and mathematician, he would reason well; as mere mathematician, he could not have reasoned at all."
— Edgar Allan Poe,
"The Purloined Letter"

Let's get one thing straight: Artificial intelligence (AI) doesn't begin with hardware. It doesn't begin with software. AI begins with the human mind. It begins where synapse and synapse communicate, where a society of brain cells transforms carbon-based atoms into an intricate web of memory, deception, and dreams. It begins at the point where rules are insufficient to describe the world. Perhaps it's no coincidence that artificial intelligence begins with art.

AI is about endowing computers with abilities that look a lot like the incomprehensible ability of the human mind to find order in a chaotic influx of data, to find patterns in visual and aural information. AI is about software that can apply abstract concepts to abstractions. AI is about hardware that makes this possible. AI is about making computers do things that, only a few years ago, the pundits were all saying computers would never be able to do (a definition that was true ten years ago, is true today, and will probably be true ten years from now).

BY DANIEL W. RASMUS

PETER A. GOULD


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Speech
Audition
Olfaction
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Most of the advances in computer science to date have used brute force — faster and more complex chips, more efficient computational algorithms. The goal of AI is to leapfrog the technology, to work smarter instead of harder.

Most of the research in AI falls into four or five main categories aimed at solving one or more of the "classic" problems of AI (each of which parallels one or more of the basic functions of the human brain). These include

- Visual pattern recognition (how does the brain make sense of a jumble of pixels?).
- Speech recognition (how do you understand or create something as complex as a sentence which — at least in English — requires that you know something about how the sentence is going to end before you can begin it properly?).
- Problem solving (how do you apply logic to move mountains and — even handier — how do you know when to abandon logic and just guess?).
- Developing expert systems (how do you explain intuition and hunches based on years of amassed experience with a particular type of problem?).

To address these tasks, AI uses a collection of tools with such esoteric-sounding names as neural networks, perceptrons, and heuristics.

AI is still mostly theoretical. There are a few commercially available programs for developing expert systems out there, but mostly AI exists on university mainframes and minicomputers. (This may always be the case if you buy the definition that AI is whatever computers can't do yet.) However, more and more hardware and software AI tools are showing up for the Mac, and the Mac can already do many of the things that the skeptics of yesteryear were saying that no computer would ever be able to do.

LET THE GAMES BEGIN

Games were the first challenge that the pioneers of AI sought to tackle. The idea was to present an intelligence test to the computer in which the rules and objectives were easy to define but the strategies for finding optimal solutions were complex. For some simple games, it's easy to find a strategy that never loses. Beginning computer science students are often given the job of writing an unbeatable tick-tack-toe program as a homework problem. But other games aren't so easy.

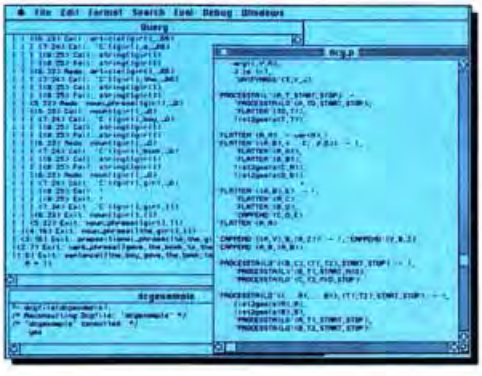
Most of the research in AI falls into four or five main categories aimed at solving one or more of the "classic" problems of AI.

In the early days, 4-kilobyte monster computers were pitted against checkers players and chess players. There are now computers that can play checkers better than humans, but an unbeatable chess computer has yet to be realized.

Like checkers, chess can be defined by rules about the initial conditions (where the pieces go at the start of the game), how play progresses (players alternate moves in which different pieces follow different rules: bishops stay on the diagonals, rooks move perpendicularly, knights have silly walks, etc.), what the objective of the game is (to put your opponent's king in a situation in which it can't avoid being captured), and how to monitor your status (by counting pieces and evaluating your position).

But it isn't one's mastery of these rules that separates the good player from the bad (or, perhaps more importantly, the good player from the great). For human players, that usually entails learning a set of board positions memorized over decades of diligent observation. Good players learn when a short-term setback could pay off with a long-term advantage (by sacrificing pieces for position, for example).

In theory, these guidelines could be translated into a set of complex rules that could be embodied in a huge but relatively straightforward program. The software would simply evaluate every possible response to every possible move, given the current position of the board. The relative merits of any particular move, however, depend on an evaluation of how your opponent could respond to that move, which in turn requires that you consider how you might respond to each response (bearing in mind the different way the board will look at this point), and so on. That is, the software must look several steps ahead to properly evaluate a move. In other words, the human player mumbles to herself, "If I do that, he'll either do A or B, and if he does A, I could do C — to which he could respond D or E, but if he does B, I could do F, G, or H, and he might do. . . ." (Human chess players often pride themselves on how many moves into the future they can anticipate — a



This example of Prolog code shows the language-interpretation capabilities built into AI languages. The program trace in the upper-left corner shows how Definite Clause Grammar is used to parse sentences in natural-language systems.

good player might look five steps into the future — although one chess master was notable for insisting that one had to look only one step into the future, as long as it was the right step.)

Great players might not actually calculate more than a few steps ahead, because they've developed an intuition that immediately leads them to the best couple of options without evaluating every alternative. Computers, in contrast, are better suited for checking out all the options — perhaps looking ten, twenty, or a hundred moves deep. And, given enough time and computing power, a computer adopting this strategy might be unbeatable. Unfortunately, none of us would be around to find out. Claude Shannon, the founder of information theory, estimated back in the 1950s that this approach would require 1,095 years of processing time per move. (With a Cray, it might take only a few months per move.)

SPACE MANAGEMENT

Most AI researchers — and chess players — aren't that patient. And most commercial applications are more complicated than a game of chess. The alternative is to develop what are called heuristic techniques or rule-based expert systems that reduce the "search space" to a more manageable scope.

Here's a simple example of how to reduce your search space. In the morning you have to decide what to wear. Your outfit must satisfy two objectives: Does it fit your mood, and is it appropriate for today's weather? Even if you have a relatively modest wardrobe, there are still a huge number of combinations of clothes you might wear; it would take a very long time to consider each combination every morning, and evaluate how well it meets the two criteria. But you can eliminate all but a tiny fraction of the possible options if you check the weather first. If the weather is sunny, you can immediately discount all the clothing items appropriate for cold, rainy, or snowy weather. You have reduced your search space, and you can reduce it even more by eliminating options that clash with your mood. You

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40					
43	$ 736/40			$ 619/40	
45		$ 812/32	$ 675/32		
60	$ 773/40			$ 680/40	$ 696
65			$ 862/32		
80			$1123/19		
81		$1135/28		$ 996/28	
100		$1532/25	$1398/25		
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should be left with only a few possible combinations left to consider. And you've discovered a heuristic rule — if you check the weather and your mood *first*, you can simplify the problem enormously.

Because some expert system "shells" are so simple, managers and technicians are taking AI out of the computer room and making it a viable local tool, much like spreadsheets made calculations a desktop phenomenon ten years ago. Expert systems are an enabling technology that makes possible the capture of knowledge rather than the display of computer number-crunching acumen.

KNOWLEDGE NAVIGATION

Another fundamental issue at the heart of AI is the issue of knowledge representation. The whole of AI hinges on not only how to look for information but also how to structure the information you're looking for. The simplest and most common represenation scheme is the IF/THEN statement of propositional logic. The 1,095-year chess strategy consists of a collection of complex and compounded nested IF/THEN statements. IF/THEN logic is also good for storing up expert system strategies based on experience: IF the lever is up AND the machine is stopped, THEN push the red button.

But to deal with generalities, you'll need to turn to predicate logic, the language of syllogisms and sets. You remember syllogisms: All men are mortal; John Sculley is a man; therefore, John Sculley is mortal. By comparing the category of things that are mortal with the category of things that John Sculley is, you discover an overlap and derive a new fact.

Other knowledge-representation techniques include semantic networks in which pieces of information are linked by a developer-created set of relationships like "a canary IS A bird" or "a hammer HAS A handle." Semantic networks help define relationships between objects.

I'VE BEEN FRAMED

Another representation method is the frame. Frames are places where stereotypical descriptions of THINGS are kept. If someone says BIG MAC, you perhaps think of two all-beef patties, special sauce, lettuce, cheese, pickles, and onions on a sesame seed bun. It would be hard to classify that description as a set of rules, so BIG MAC would be entered into the knowledge base as a specific example of the frame HAMBURGER. From HAMBURGER, the BIG MAC would inherit buns and meat. Other characteristics of the BIG MAC would be unique to its frame. If a knowledge-based system needed to know what comprised a BIG MAC, then one inspection of the BIG MAC frame would reveal all that needed to be known.

These techniques — propositional logic, predicate logic, semantic networks, and frames — establish the baseline upon which AI systems are built. If things are built, then they need a set of raw materials. In knowledge-based systems, those raw materials are called Prolog and LISP, two of the most popular languages for AI software development. See the sidebar "The Language of AI" for an overview of these and other widely used AI environments.

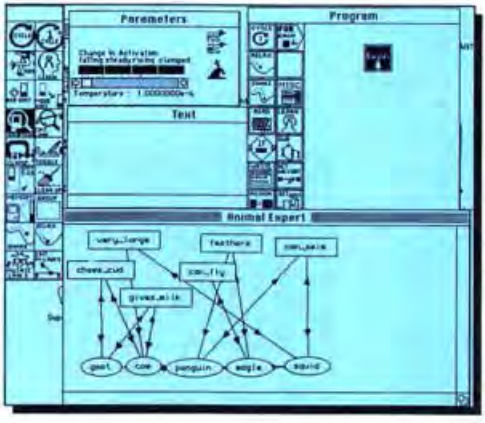
SPEAKING OF LANGUAGE

The languages many AI programmers would rather use, however, are English, French, and Japanese. So-called *natural-language processing* is one of the most widespread goals of AI.

The processing of natural language comes in two forms: speaking and understanding. Anyone familiar with Talking Moose, that ubiquitous desk accessory with the wise-cracking antler-head, knows that a Macintosh can speak English. Most typists acquainted with Microsoft Word know equally well that a Macintosh cannot understand English. It is the understanding of words, contexts, and meaning that drives AI researchers.

Simulating human speech by translating the 39 phonemes of American English was a simple task compared to the immensity of teaching a computer to understand a simple typed phrase like "Did the wind wind the kite string through the window?" How can the computer distinguish *wind* (the noun) from *wind* (the verb) from *wind-* (the syllable)? The job is even harder if you want to speak, rather than type, to your computer. It's possible for computers to "listen" to a sentence, digitize and capture the sound waveforms, pick out the component phonemes, and compare those sounds with a dictionary that lists words as combinations of phonemes. But how can a computer know whether you said *illegal* or *ill eagle?*

The answer is context. Suppose you say the phrase "illegal U-turn." Since U-turn is a noun, the adjective *illegal* probably makes more sense in front of it than the noun phrase *ill eagle*. Unless you're telling someone to turn around when they see a sick bird in the



MacBrain simulates the complexity of the human brain through a technology called *neural networks*. This example shows the classic animal identification expert system described as a semantic network. The nodes are small independent agents that learn by example.

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The Language of AI

The Macintosh's popularity is growing in the AI community but doesn't yet have the same breadth as that of its big blue cousin. In programming languages, however, the Mac can hold its own.

Second only to FORTRAN, LISP has stood the test of time. This highly parenthesized language is the basis for most expert systems, as well as many natural-language and vision systems. LISP is the backbone of the AI community.

LISP stands for LISt Processor. Everything in LISP is a list. Data is contained in lists. Programs are contained in lists. In fact, there is no distinction between data and programs. At one point in a program's execution, a symbol may represent the number 2. A few moments later that same symbol may represent the program string `'(CAR(CDR(X,Y,Z)))`. To programmers who were brought up in the highly structured fraternity of Pascal or C, LISP seems like an orgy of bad programming techniques. This rambunctious language does what few languages do: It talks to itself. The power of recursion is embedded in the very nature of LISP. If you are to write intelligent systems, they must be able to call on images of themselves that are slightly different depending on the circumstance. LISP also has the ability to modify its own code. Isn't self-modification a test of intelligence?

Many variations have arisen from John McCarthy's original LISP. LISP is a language made for extension. It's also a place to write other languages. From this capability came Prolog.

Prolog was developed in France in 1973 and is the language of choice for Japan's national Fifth Generation computer project. Prolog is a programming language that has built-in backward chaining and — because it is designed around predicate logic — representational structure.

Excellent LISPs are available on the Macintosh, including Allegro Common LISP from Coral Software and ExperCommon Lisp from ExperTelligence, Inc. A public-domain version of LISP called XLISP by David Michael Betz is available on CompuServe and GEnie. Prolog is represented on the Macintosh by LPA MacProlog, AIS Prolog, and other less complete packages.

Other languages that have proven to have worth as AI investigation tools include POP-11 from the University of Edinburgh and Smalltalk from Xerox PARC. POP-11 has made a recent Mac appearance in the form of AlphaPop, from Britain's Cognitive Applications.

The more common C, Pascal, and Assembly languages have also proven to be popular for developing AI products on the Mac. The Macintosh is first and foremost a business machine that requires marketable applications, not development systems, and these languages are more familiar and easier to use for many programmers. The concepts and techniques, however, for C- and Pascal-based AI products on the Mac owe their history and existence to LISP and Prolog.

road: "After the ill eagle, you turn." In short, context is the key, but context is a complicated beast.

Our simple understanding of English is based on not only what we know of words but also a million moments of memory that tie those words to meanings. If you have ever watched the Benny Hill Show and tried to fathom some of the British-laden jokes with your American sensibilities, you have some understanding of what it is like to teach a computer to understand English.

Natural-language processing has been somewhat neglected on the Mac. On other machines with less friendly interfaces, the demand for a better way to communicate with the machine has led to a landslide of add-ons and products, like Q&A, HAL for Lotus 1-2-3, and Genifer for dBASE III. When natural language becomes more plausible developers will, no doubt, be asked for word processors that can be dictated to. The day will come.

To deal with natural language, computers must be taught to deal with ambiguity, imprecision, incompleteness, and inaccuracy. The bits and pieces that we hear are often not complete, but our brains help fill in the blanks by applying stereotypes of knowledge to the missing pieces. Frames are often used for natural-language processing. The best systems, though, are capable of understanding only a few thousand words; within that understanding, context is difficult to establish. Natural language faces the same struggle as other AI disciplines: understanding. Until a computer can understand what you want, it will be difficult to turn knowledgeable idiots into intelligent devices.

SEEING IS BELIEVING

A child is flooded with information. The smell of sweat on its mother's body, the light reflecting off its father's glasses, the touch of grandma's hand and the cool taste of fresh milk all feed information into the memory banks of a child. The senses of smell, touch, and taste are things electromechanical sensors can only approximate. Your household smoke detector cannot tell the difference between the smoke of a life-threatening fire and that of a skillet of overcooked eggs. Artificial intelligence researchers are inching closer to systems that can turn the reflected light of table edges and eyebrows into digital pictures that a computer can comprehend.

Like natural language, vision systems are in their childhood. But many manufacturing companies are already putting vision systems in place for quality control or precise adjustments of delicate parts. These vision systems are trained to recognize certain features of an object. The feedback from these objects is translated into a computer that can detect the edges of the object and feed that information into a program that knows what to do with a particular arrangement.

Automatix Corporation has recently announced a vision system that works with its industrial-strength Macintosh, the AI 90. Autovision 90 uses the Automatix Standard Application Package and MacRAIL application development languages, cameras, and an AI 90 Macintosh for creating manufacturing applications.

The early image digitizers that turned your Mac into a what-you-see-is-what-you-get MacPaint processor saw the world as a series of dots or shades of gray. In addition to static images, AI researchers must address the interpretation of color, depth, tex-

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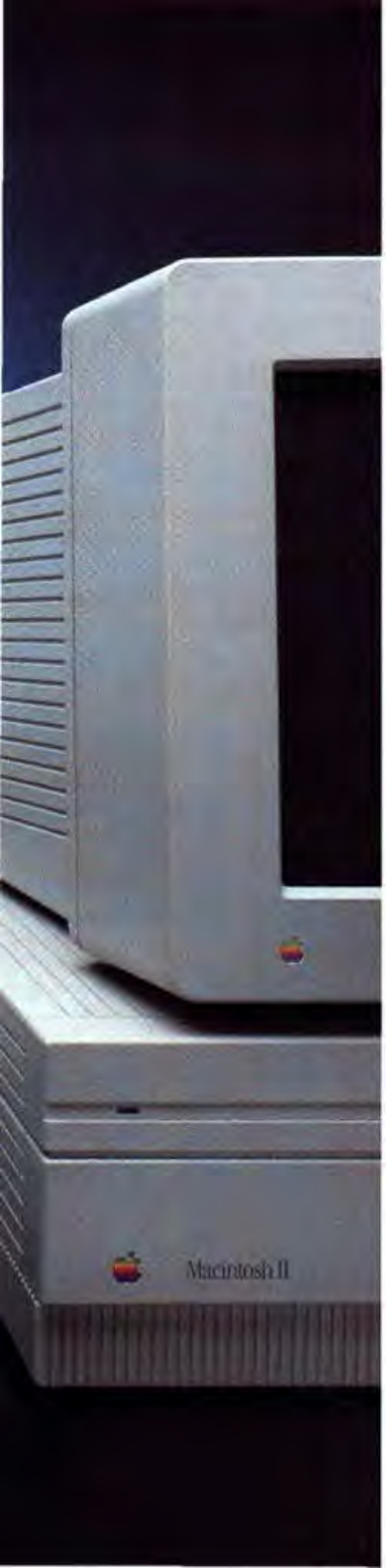
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ture, and motion. Some vision systems use models of real-world objects to provide the vision interpreter with a sample of what it should look for.

PERCEPTIONS AND PERCEPTRONS

Many AI researchers look to their creations as ways to expand our knowledge of the universe by enabling computers to do things people cannot do. The most challenging task for these scientists is teaching machines what humans *can* do: think. The representation schemes discussed earlier help translate learned experiences into computer-readable form. But many things that we do simply can't be expressed as lists of rules. Telling (or understanding) a joke, for example, defies description using a systematic set of rules, as any stand-up comic could tell you.

An alternative approach called *neural networks* has developed out of theoretical work in the 1950s (when this concept went by the name of *perceptrons*). These standard hardware programs simulate parallel processing agents to model the intense interconnectivity that takes place in the human brain.

Neural networks arrived on the Macintosh in the form of a much-flawed program called MacBrain. This program implements neural network algorithms that go by the ominous-sounding names of Hebbian/Hopfield, Back Propagation, and the Boltzmann Machine. Although the program is poorly implemented, it can help demonstrate the pattern-recognition abilities of neural networks.

Like children learning right from wrong, neural network systems are given an example of something and asked to identify it. If the identification is wrong, a kind of computer switch stick is used to direct the program toward the correct identification. As more examples are shown, the system is given positive reinforcement toward finding the right solution. Once the solution is embedded, it has another annoying similarity to human behavior: Neural nets are hard to break of a bad habit. When a rule-based system makes a wrong choice, you change a rule. When a neural-net system makes a wrong choice after hours of learning, it is very difficult to get it to change its behavior.

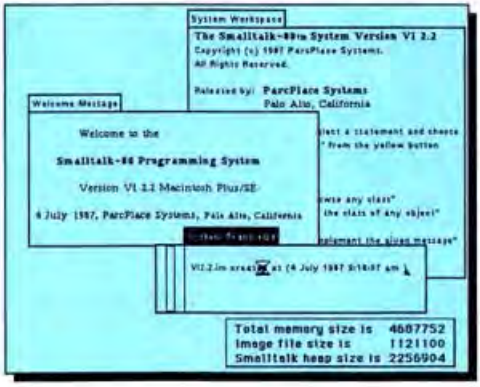
Neural networks are not the answer to the "understanding problem" in AI, but they may prove to be the technology that brings the sensory input to the computer in a way that is understandable.

THE OBJECT OF IT ALL

One of the most exciting new AI tools is object-oriented programming. The concept of Mac windows comes from the world of object-oriented programming. At a recent conference, noted AI lecturer and author Avron Barr called the Macintosh an "AI Machine" because of its intelligent interface. What is really happening behind those windows is message passing, and message passing can be applied in areas a lot more diverse than windows.

Object-oriented systems are an alternative to long, complex programs that have a huge overhead and an impossible sense of complexity. In the object-oriented world you create representations of real-world things, and those things have the knowledge or procedures they need embedded in them. Then they talk to each other.

Smalltalk, the language that inspired the Macintosh interface, is the premier object-oriented language where the passing of messages takes the place of conventional looping and iteration. Smalltalk comes to the Macintosh as Smalltalk-80 from ParcPlace Systems. This full implementation of Smalltalk provides a wonderful new world for AI enthusiasts and a completely different reality for programmers familiar with C or Pascal. Another less extensive version of Smalltalk is available to members of APDA. And



The Smalltalk environment displays the origins of the Macintosh. Developed at the Xerox Palo Alto Research Center, Smalltalk introduced many advanced features like message passing, windows, and intelligent objects.



Artificial intelligence is full of computer tricks. One of the most useful is called *recursion*. In this screen shot, Semantic Microsystem's MacScheme uses recursion to solve the Fibonacci numbers equation.



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Xerox has developed Humble, an expert system shell that runs in Smalltalk. Since ParcPlace System's Smalltalk-80 runs on a number of computers, it appeals to people who want to develop systems on one computer and transfer them to another. Smalltalk's major disadvantage is its interpreted nature, which makes program execution sluggish.

The newest object-oriented language in wide use is a strange thing called HyperTalk. That's right — if you've ever scripted in HyperCard, you've been using one of the hottest tools of AI. HyperTalk uses message passing to communicate between buttons, backgrounds, and fields. A QUIT message that has passed from the button through the script to the menu bar would read like Listing 1.

Object-oriented languages are excellent places to build virtual realities. Gauges or buttons on the screen can simulate actions or actually affect the real objects. These programs can add and subtract as well as FORTRAN, but they can also create representations of the world that can answer a question without going to the main control loop for guidance.

THOUGHT CAN BE MOVING

AI researchers do not have visions of thinking boxes, they have visions of intelligent house mates and smart weapon systems. Robots force AI technologists to face the most difficult aspect of the science: self-realization. Until a computer or robot can realize what its capabilities include, or what the meaning of a word implies in a certain sentence at a certain point in time, then AI remains a bag of computer tricks. Self-realization, and its accompaniment called learning, are driving AI deeper into the workings of the human mind and toward hardware and software combinations that can better approximate the workings of our complicated neural activity. When your household robot modifies its programming to make you more comfortable or overrides a direct instruction to save a human life, artificial intelligence will have arrived.

George Lucas' vision of machine intelligences like R2D2 and C3PO involves the integration of all the branches of AI: expert systems, speech recognition, vision, and robotics. The robotic world melds the various forms of knowledge representation, vision, and other AI tools into an intelligent, moving unit.

Today's robots can't live up to the legends established by their Silver Screen counterparts, but they are becoming useful contributors to industry. If your car has paint, it was probably applied by a robot.

Joseph Weizenbaum — well-known psychiatric simulator, creator of the ELIZA, and one of the fathers of AI — has turned against AI because he believes AI research may be creating a new species that could remove the humanity from humanity. Weizenbaum fears that our silicon-based creations will have as much difficulty in relating to what is important to humans as we had in telling them how to be self-aware.

But most AI researchers look to the combination of techniques, tools, and technologies as a way to supplement human intelligence, not to supplant it. The creation of mechanical, artificial organisms is many years — perhaps centuries — away. What AI gives us today is ways of amplifying our own vision or memory.

DANIEL W. RASMUS IS A MANAGER OF ADVANCED MANUFACTURING SYSTEMS AT WESTERN DIGITAL. HE IS A FREQUENT WRITER AND LECTURER ON AI, COMPUTERS, AND MANUFACTURING.

Listing 1:

```
on  mouseUp
   answer "Are you sure you want quit?" with "Yes" or "No"
     if it is "Yes" then
        doMenu Quit Hypercard
     end if
end  mouseUp
```

Directory

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AAIS Prolog v1.15; $199

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Smalltalk-80, v0.4; $75

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Coral Software
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(617) 547-2662
Allegro Common LISP; $600

ExperTelligence, Inc.
5638 Hollister Ave., Suite 302
Goleta, CA 93117
(805) 967-1797
ExperCommon Lisp; $995
ExperLisp; $495
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Ask the Experts

Can't find Mr. Know-It-All? Don't worry. Using your Mac and an expert-system shell, you can create an expert system without the hair pulling associated with conventional programming.

If you're a kid, finding an expert is pretty easy. Just track down Mom or Dad, and that's usually it. A little later on you can ask your teacher or librarian. But as you get older still, and your questions become more difficult, it gets harder and harder to find that one person who can tell you just what you want to know.

Expert systems are computer programs that simulate human experts (much as Bullwinkle Moose did in the role of Mr. Know-It-All). An expert system attempts to encompass a broad base of human knowledge, and more importantly, tries to make that information interactively and context-specifically accessible to the user. A tall order, for sure. Just ask Rocket J. Squirrel.

At least a part of this task can be handled by conventional relational database software. But as opposed to a database, an expert shell includes a simulated "brain," as it were, called an *inference engine*. This component makes it possible for the system to infer reasonable conclusions derived from its rules of knowledge.

Until recently, building an expert system could be accomplished only through brute coding with a language like LISP or PROLOG (see "Artificial Intelligence from A to I" in this issue for more on the programming languages of AI). Creating expert systems in this manner offers freedom and power, but it also requires a large amount of time, effort, and programming expertise. The advent of the expert-system *shell*, however, has brought the capability of expert-system creation to the fingertips of the lay Mac user.

Expert-system shells provide a predefined architecture within which you can create a custom system. The key advantage to using shells, and one of

STEVEN HUNT

BY DAN SHAFER

the major reasons that most expert systems today are developed using them, is that an inference engine is already present. That means that the part of the program responsible for examining the rules and facts in a knowledge base, deciding which rules to apply and in what order, and what questions to ask the user, has already been designed.

And because the inference engine itself never changes, expert-system authors don't have to reinvent the wheel with each application. They have only to focus on creating the knowledge bases themselves.

A year ago, there was only one serious expert-system shell running on the Macintosh, and a very small handful of would-be products that were not quite ready for smart time.

Today, there are six serious expert-system products listing for under $1,000, with another national heavyweight scheduled to debut soon.

This article takes a close look at several of the more popular, established shells:

- Instant-Expert Plus (Human Intellect Systems), the "big brother" of Instant-Expert, one of the oldest shells, and an established performer.
- LEVEL5/Mac (Information Builders), a Mac implementation of one of the longest-established shells in the IBM PC arena.
- MacSMARTS (Cognition Technology), an easy-to-use, if somewhat limited, shell.

We'll also examine the question of what kinds of problems lend themselves to the particular brand of logic these shells represent. Using each of the tools, we'll build an expert system that will provide us with consultation about the proper topics for expert-system applications.

> Problems that are most amenable to expert-system resolution often have more than one potential solution.

These particular shells were chosen because each demonstrates a radically different approach to expert-system design. Instant-Expert Plus uses a fill-in-the-blanks approach, usually with minimal programming required. MacSMARTS takes an example-description approach and doesn't include any programming capability. LEVEL5/Mac is very much like a programming language.

By going through the process of constructing a simple but nonetheless useful expert system, you'll get a chance to learn the answers to two of the most often-asked questions about the possible use of this technology: What are expert systems really good for? Which Mac-based expert system should I choose?

A Shell Collection

While we've only looked at three expert-system shells in this article, they represent the three approaches that all seven Mac shells use: templates, programming, or examples.

Like Instant-Expert Plus, Intelligent Developer (Hyperpress Publishing) uses templates with some programming.

Programming is still the most common method of creating an expert system, although the actual amount of code required is considerably less than you'd need were you to build everything from scratch. Cognate (Peridom), ExperOPS5-Plus (ExperTelligence), Instant-Expert Plus, Intelligent Developer, LEVEL5/Mac, and VP-Expert (Paperback Software) all use programming as a means of building an expert system, but in varying amounts.

Of the seven, only MacSMARTS bucks the programming approach entirely, in favor of creation by example.

WHO'S THE EXPERT?

The expert system we'll construct will address three related questions:

- Does the problem have enough characteristics that are beyond the ken of most algorithmic languages and tools that applying an expert system is not the software equivalent of shooting flies with a howitzer?
- Does the problem fall short of the area of intelligence that is, at least for the moment, the exclusive province of natural experts? In other words, is the problem subject to an expert-system solution, or can it be solved only by a human expert?
- Can the problem withstand a major potential shortcoming of expert systems?

The first question is designed to eliminate from consideration any problems that can be solved using databases, spreadsheets, or other more conventional business applications packages. We want to know whether the problem we are analyzing requires some sort of intellectual activity that is a significant step beyond where most such traditional software ends: whether it requires knowledge, a reasoning process, the drawing of inferences, or the application of judgment.

Knowledge, as opposed to data, implies an understanding or explanation of a process or relationships. If a human being can know both how to do something and how to explain it to someone else, then we are dealing with knowledge, rather than simple data or algorithms.

If a problem's solution requires a process of reasoning, probably involving the drawing of inferences, it is a good candidate for an expert system. The process must go beyond mere calculations. Balancing a checkbook is a purely algorithmic process. It may even defy reason, depending on how well you keep records! But diagnosing an illness or troubleshooting a hard disk problem requires analytical thought and reasoning. Expert systems are good at solving such problems. Even if the software must infer some conclusions from other facts not explicitly stated in the system, an expert system still might work. A classic example is the famous syllogism:



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All men are mortal.
Socrates is a man.
Therefore Socrates is mortal.

An expert system, given the first two facts and a proper inference engine, can draw the third conclusion by inference from the two stated facts. A Pascal program without some form of programmed inference engine or logic process would be unable to do the same thing, as would most databases.

There are some kinds of intellectual activity that nobody has yet successfully programmed into a computer. Some of those that are of primary interest to us in examining expert systems are adaptability to novel situations, creativity in approaching the problem, the use of common sense, and resolving ambiguities in information supplied to the system. If you are about to build a system to solve a problem that involves any of these feats, an expert system is not a good solution. (Neither, for that matter, is any other off-the-shelf software we know about!)

Finally, most expert systems involve the application of rules of thumb (formally, heuristics). Heuristic approaches do not always yield the optimum solution to a given problem. This is because of the way they search through a set of possible solutions and come up with one that works. They don't necessarily know about all possible solutions, and even if they do, they aren't always designed to produce the best possible answer. This can be seen as a limitation, depending on the kind of problem you're trying to solve.

> Each rule in Instant-Expert Plus must belong to a class, or set of rules.

Problems that are most amenable to expert-system resolution often have more than one potential solution. We may want to design the system in such a way that it offers us all of the possibilities, perhaps ranked in order of their likely utility or value.

When we take all of these basic principles and put them into the traditional production-rule format of an expert system, we get a set of rules like those shown in Figure 1. Production rules describe the decision-making process the expert system is emulating. They take the form of IF/THEN constructs and in some systems also support ELSE clauses. The IF portion is called the premise or condition of the rule, and the THEN clause is the conclusion; each clause can contain one or more entries.

There are only three rules in this system. Each rule has four conditions and a single conclusion. Figure 2 explains how an inference engine might sift through those rules and come to an appropriate conclusion.

A Shell Apart

NEXPERT OBJECT, the Cadillac of expert-system shells not only on the Mac, but also on most other hardware platforms from mainframe to micro, is a $5,000 package that's probably out of the reach of people who are just beginning to explore the use of expert systems, but it's also a far more robust and complex shell.

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If you decide that you're serious about expert systems on the Mac, you owe it to yourself to check out the power of NEXPERT OBJECT.

The basic process of going through a set of rules like those in this example and coming to an appropriate conclusion is not so complex that it could not be programmed in Pascal, C, or some other conventional language. The trick in an expert-system shell is designing a program that can deal with any arbitrary number of rules on any subject, with any reasonable number of premises and conclusions.

With that expert-system rule set in mind, let's turn to the specific shells and see how each handles this set of rules. Our objectives are to find out what it feels like to develop a system using each of these products and to see what this expert system looks like as it runs in each of these environments. This should make it possible for you to decide which is best for you.

AN EXPERT IN AN INSTANT

Instant-Expert Plus uses a fill-in-the-blanks approach to rule definition and a point-and-click method of variable typing, and is designed to make extensive use of external files to display information to the user during a consultation. Figure 3 shows what one of the rules in our sample knowledge base looks like when it has been entered into an Instant-Expert Plus rule template. The rule template itself is largely self-explanatory, but it does have some peculiarities.

Notice along the right side of the template a series of check boxes. In the top portion of the template, where the conditions (IF clauses) of the rule are entered, these check boxes are labeled "A". This stands for Ask. If these boxes are checked, the user can be asked the question indicated on that line of the conditions. If it is blank, the expert system will never ask the user for the value of the variable or for a response to the proposition stated on that line. Unchecked lines indicate intermediate conclusions the expert system will reach, or inferences it will draw, from other questions it asks the user. Similarly, in the bottom of the template, there are several check boxes labeled "D," which stands for Display. If one of these is checked, then Instant-Expert Plus will display the statement or the result of a variable assignment to

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Ask the Experts

Figure 1.

Problem requires intellectual activity AND
Problem does not demand human intelligence AND
Problem requires use of heuristics AND
Problem will tolerate less than optimal answers.

Problem is good candidate for expert system.

Problem calls for knowledge OR
Problem calls for reasoning OR
Problem calls for the drawing of inferences OR
Problem calls for the use of judgement.

Problem requires intellectual activity.

Problem does not require adaptability AND
Problem does not require creativity AND
Problem does not require use of common sense AND
Problem does not require resolving ambiguous input.

Problem does not demand human intelligence.

Figure 2.

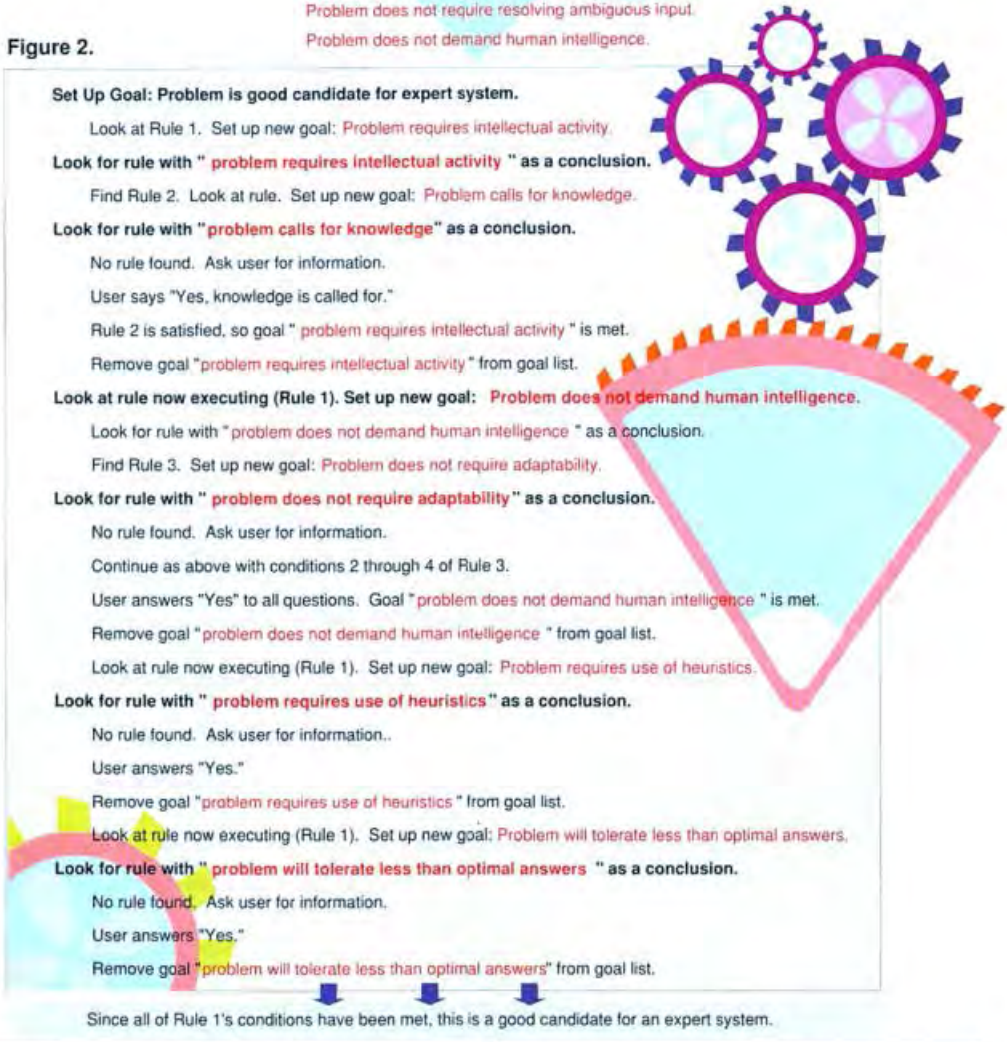


Figure 1: An expert system's production rules are commonly stated as IF/THEN constructs. The three rules in our expert system are shown here.

Figure 2: Once the rules have been stated, the inference engine takes over and does the processing.

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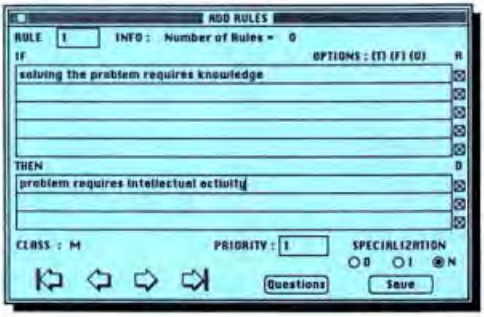


Figure 3: Instant-Expert Plus's rule template shows this rule as a propositional statement.



Figure 4: Instant-Expert Plus's rule template can use a variable (in this case "knowledge") in a rule condition.

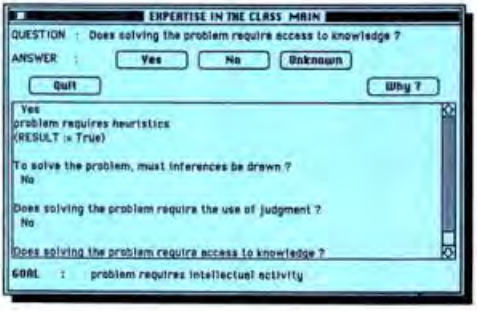


Figure 5: When a consultation is in process in Instant-Expert Plus, this is how a question, based on a propositional definition, is phrased.

the user during a consultation. Leaving it blank suppresses the display.

At the bottom of the rule template are two items that bear further explanation. Each rule in Instant-Expert Plus must belong to a class, or set of rules. In our expert system, we have only one class and all rules belong to it, but in a more complicated system, you might well subdivide the knowledge into multiple rule sets. This would enable you to make the consultation more efficient by turning on and off various rule sets based on information obtained or inferred. Each rule in Instant-Expert Plus has a priority assigned to it. The default value is 1, but you can assign a value all the way up to 100. Instant-Expert Plus uses this prioritization value to decide which of several rules to execute to move toward resolution of the problem. When more than one rule will do the job equally well, this method is used for tiebreaking. It can also be used to force some rules to execute before others, though that is a specialized need.

In phrasing the conditional part of a rule in Instant-Expert Plus, you can choose one of two methods. The first involves the use of propositions, stated as partial sentences. For example, suppose we want to state the rule:

IF solving the problem requires knowledge,

THEN the problem requires intellectual activity.

We can define this rule exactly as we just stated it (see Figure 3). The conclusion can then be used precisely as it appears in Figure 3, as a condition to another rule (as we saw in our sample three-rule set).

Alternatively, you can use variables to state the rule (see Figure 4). If you choose this approach, you will have to define a variable, give it a type, and then use it in your rules. We have defined "knowledge" to be a Boolean (true/false) variable. Instant-Expert Plus also allows for string and numeric variables.

If you use the propositional method of defining rules, the system will automatically phrase questions during the consultation. For example, if you define the rule as shown in Figure 3, then the user will be asked, "solving the problem requires knowledge?" and be permitted to click on buttons that say Yes, No, or Unknown (see Figure 5). If, on the other hand, you define a variable, you must then phrase a question for the system using the question-definition box, which lets you ask the user about the value of the variable ("Does solving the problem require access to knowledge?").

Instant-Expert Plus comes with a built-in programming language that has more than 70 functions, commands, and operators. If we want to display information about the consultation when the system is in use, we will need to use the SHOWTEXT function. This command requires us to provide the name of a text file. Instant-Expert Plus then reads that file into memory, displays it in a window, and waits. The user reads the text, dismisses the window by clicking its close box, and the consultation automatically proceeds. This is handy for informing the user of progress during the consultation and for displaying intermediate conclusions as well as our final recommendation. For example, in our sample knowledge base, we want to let the

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user know when his or her system definition passes each major hurdle. So we create a series of files containing this information and call upon them as needed. Because SHOWTEXT is a function, it must be stated in a rule by assigning its result to a variable:

(result:=SHOWTEXT("Heuristics"))

This must be a Boolean variable.

To define our three-rule statement about qualified expert-systems problems completely, Instant-Expert Plus turns out to require 16 rules. There are two primary reasons for this.

The publisher of Instant-Expert Plus recommends strongly against the use of OR logic in rules, suggesting instead a separate rule for each condition that might otherwise appear together in a single rule. It is true that the use of OR logic can lead to knowledge engineering errors, problems debugging finished systems, and other kinds of confusion. This requires our second rule, consisting of four conditions linked by OR connectors, to be restated as a set of four rules; one for each condition, with the same conclusions in each case.

We must deal with the situation that arises if none of the conditions leading to a subgoal turns out to be provably true. Again looking at the second rule in Figure 1, we note that if none of the four conditions can be proven, we don't have an outcome for the system to resort to. These "boundary conditions" must be explicitly stated, usually in a rule.

Before leaving Instant-Expert Plus, we should consider a distinguishing characteristic of this shell. Rather than using an interview approach to gather information about the user's problem, we can use Instant-Expert Plus' graphics capability in a "forms completion" approach, defining screens that will respond to the user's mouse-clicks and characterize the problem. Figure 6 shows one such screen defined for the sample knowledge base. The user can click on any active region. The designer can define arbitrarily shaped active regions and connect each such region to a fact, another graphic, or some command in the language.

AN EXPERT LEVEL

LEVEL5/Mac boasts a very large installed base of users on the IBM PC and compatibles, and its publisher recently announced a version for the DEC VAX, making it the most broadly supported shell in the under-$1,000 range. The PC version has been in publication in one form or another for more than three years. It started life as Insight, later changed to Insight I when its successor, Insight II, came along. When Information Builders bought Level Five Software, the original developer of the shell, last year, the new owners changed its name to LEVEL5/Mac.

LEVEL5/Mac takes a much more programming-language orientation to the process of expert-system design and construction than we saw with Instant-Expert Plus. It has a procedural flavor much like Pascal (not surprisingly; the program was written originally in Pascal). Where Instant-Expert Plus *permits* the designer to program various aspects of the system, LEVEL5/Mac *requires* such programming at every step. Programmers accustomed to a more traditional language such as Pascal, C, or BASIC are quite often more comfortable with LEVEL5/Mac than with more handholding approaches.

Because LEVEL5/Mac takes a programming tack, it is possible to use any text editor or word processor to develop your LEVEL5/Mac systems. The program comes with a built-in editor that is perfectly adequate to the task. But if you had a system running on the PC, for example, and wanted to move it to the Macintosh, you could export the rules from the PC product even if it was written in some other language. With some massaging, you could then eventually get your system working in LEVEL5/Mac. This kind of import process won't work easily, if at all, with other kinds of shells.

There is less to show and discuss with LEVEL5/Mac than with the other shells in this article precisely because it takes a programming-language approach to expert-system design. There aren't multiple screens of templates for entering rules, defining variables, or controlling the consultation.

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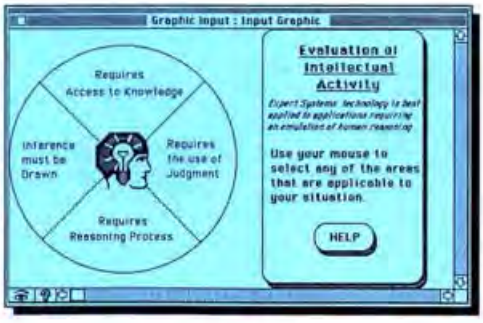


Figure 6: Instant-Expert Plus can also use an interactive graphic front end to enter facts into a knowledge base.

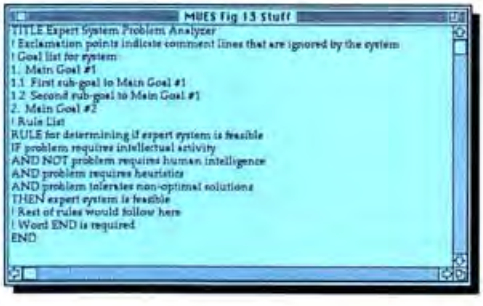
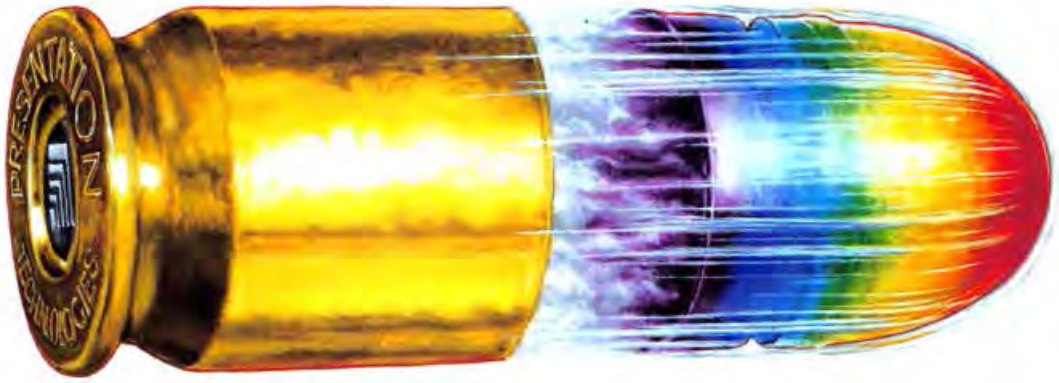


Figure 7: This is the basic structure of a LEVEL5/Mac expert-system rule.



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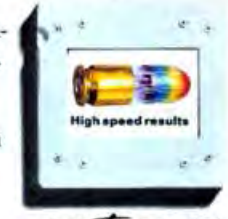
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Mac expert systems is shown in Figure 7. A LEVEL5/Mac expert system must begin with a TITLE line. It must then supply a list (in outline form) of goals for the system and one or more rules. The key word END signals the end of the knowledge base and is required. (The rules are actually not required, but it is difficult to see how you could construct an expert system without them.)

A more fleshed-out structure for a LEVEL5/Mac knowledge base would include provisions for the following items, which must appear in the order shown:

1. The TITLE of the knowledge base.
2. Declaration of facts shared by chained knowledge bases.
3. Database declaration statements.
4. Fact-type declarations.
5. Parameter initialization statements.
6. Control element selectors.
7. Goals of the knowledge base.
8. Rules that support the goals.
9. Text information to be displayed.
10. END.

In our example knowledge base, we will be concerned only with items 1, 4, 7, 8, 9, and 10 from this list.

One of the most interesting aspects of LEVEL5/Mac knowledge base design is the creation of the outline of goals. The LEVEL5/Mac compiler uses this outline to determine how the inference engine will work during a consultation. This approach is unique among expert-system tools and provides a quite natural way of organizing and thinking about the knowledge involved. By allowing the user to make some decisions about goal selection at the outset of a consultation, this outlining method can also provide a means of subdividing knowledge, just as Instant-Expert Plus divides rules into classes.

Because we are focusing on a one-goal problem and because we want to keep our discussion as simple as possible, we will define a single-goal outline for our LEVEL5/Mac system.

LEVEL5/Mac's procedural nature allows it to implement ELSE logic, an element missing from most expert-system shells. This enables us to take no more than three rules to build the three-rule expert system we have been dealing with. In fact, the rules appear to be virtually identical. Differences are accounted for by the fact that there are some reserved-word limits in LEVEL5/Mac that cause us to rephrase some of our conditions.

Figure 8 shows what a typical question would look like if we used the automatic question-posing facilities of LEVEL5/Mac. But we can get much more sophisticated than this. The LEVEL5/Mac TEXT command

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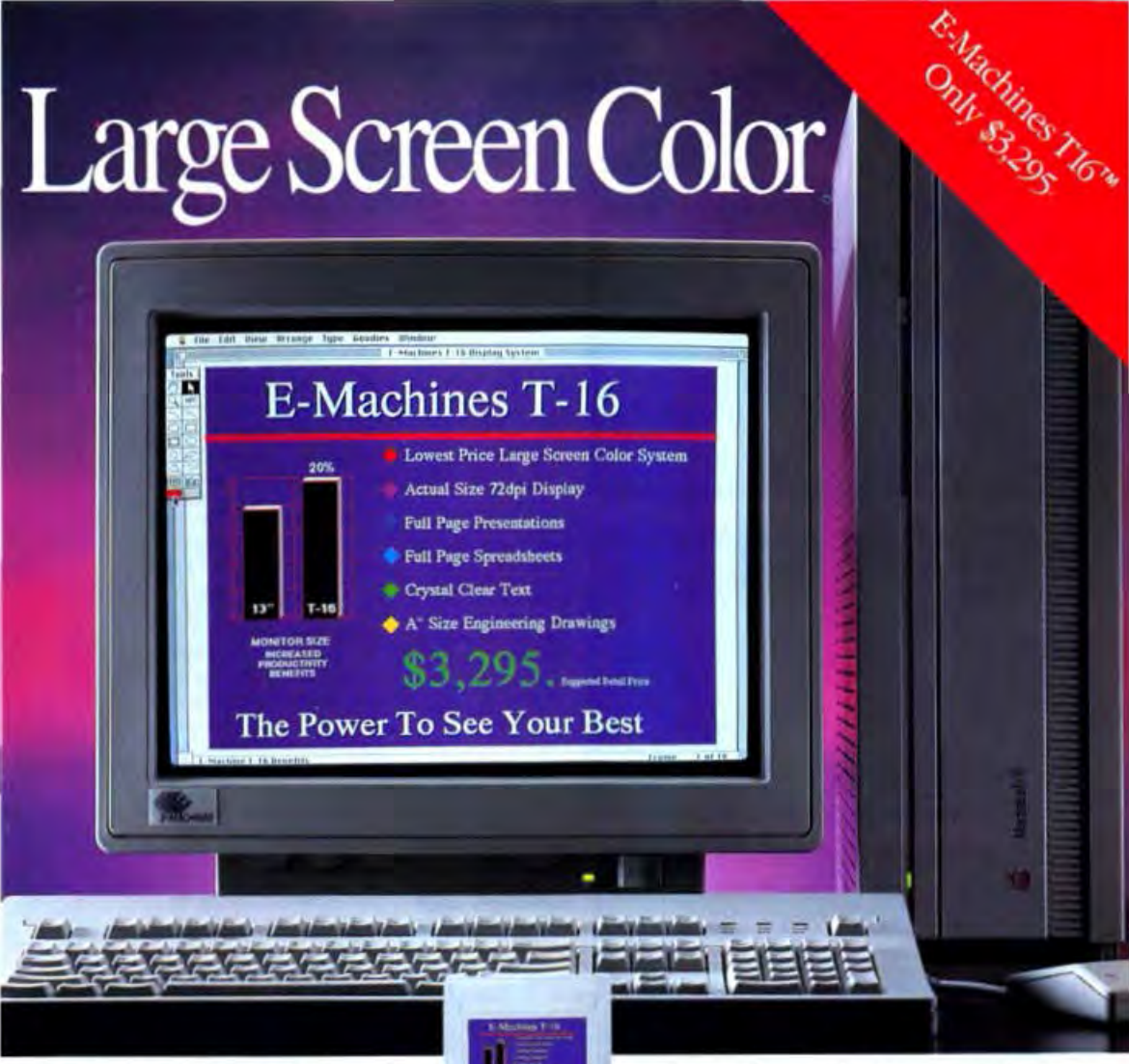
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Figure 8: In the default mode, this is how LEVEL5/Mac displays a query.



Figure 9: With only a little modification, LEVEL5/Mac's drab default display can be converted into this multiple-choice query with text-only user interaction.

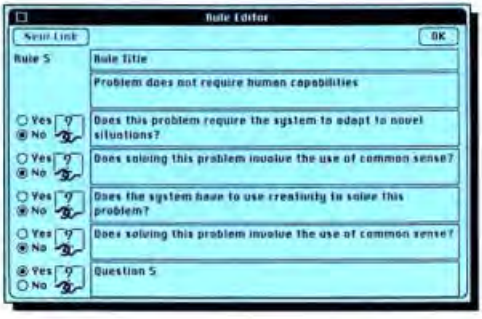


Figure 10: This is MacSMARTS' rule-editing template with a sample condition rule on display.

overrides the automatic generation of questions and provides more complete text in its place. By defining two new items as MULTI (i.e., capable of having more than one value), and writing appropriate TEXT statements, we can achieve an interface like that shown in Figure 9.

We can also display static graphics (i.e., a graphic image with which the user cannot interact as with the "hot" graphics in Instant-Expert Plus or MacSMARTS).

Among LEVEL5/Mac's other strengths are its interface with external files (its interaction with Microsoft Excel files is particularly strong) and its ability to launch another application from within LEVEL5 and then to return to it.

GETTING MACSMARTS

MacSMARTS uses a different approach to rule entry than the other two shells we've examined. It also allows us, in appropriate situations, to avoid entering rules completely, supplying instead a series of example scenarios from which the program can induce its own rules. This method is called, logically enough, *induction.*

We won't use induction in this sample knowledge base. Because of the nature of the OR logic we use in some of our rules and its relationship to induction, we would have to supply more than 125 examples to define completely and correctly all of the circumstances that would allow the program to induce a correct rule set. Instead, we will simply enter the rules in MacSMARTS in a way that is analogous to, but still quite different from, the way we've entered rules in Instant-Expert Plus and LEVEL5/Mac.

MacSMARTS uses a basic spreadsheet-style Logic Worksheet that has three rows: Facts, Rules, and Advice. We will actually use these columns in reverse order, defining first the advice, or outcomes, then the rules that lead to these outcomes. Our particular application doesn't require the use of predefined facts, so we won't use that column.

We will define five outcomes in the advice column, corresponding to the four intermediate conclusions and one final conclusion that we've already seen in the other systems:

1. Problem requires intellectual activity.
2. Problem does not require human capabilities.
3. Problem will tolerate nonoptimal solutions.
4. Solving problem requires use of heuristics (rules of thumb).
5. Expert system is feasible.

After entering each of these pieces of advice in the Advice column of the Logic Worksheet, we are ready to enter the rules themselves. This process is quite graphic in MacSMARTS, which provides a good support environment for rule entry and editing. Figure 10 is an example of one of the multiple-condition rules we will enter.

When entering advice and rules into MacSMARTS, one thing we must be careful about is the order of entry. MacSMARTS starts with the top entry in the Advice column and attempts to prove it. It then progresses down the column. So we put our preliminary goals at the top, arranged in the order

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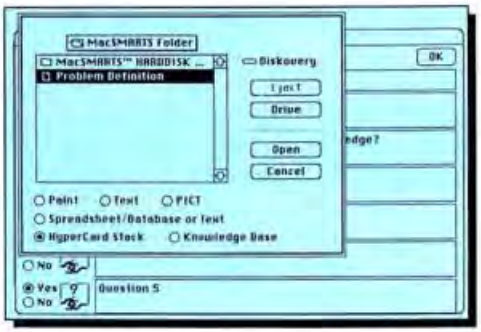


Figure 11: MacSMARTS can also be linked to other programs. In this case, the user is being linked to HyperCard while in a MacSMARTS consultation.

we wish, and our final conclusion at the bottom of the list.

MacSMARTS uses only binary, yes/no logic. This approach is also sometimes called *propositional logic* because it deals with the truth or falseness of a particular proposition. In our case, for example, one of the rules is:

Problem requires intellectual activity.

IF YES: Does this problem require access to knowledge?

If we wanted the outcome (the first line of the rule) to be true only if the proposition was false, we would reword the rule as follows:

Problem requires intellectual activity.

IF NO: Does this problem require access to knowledge?

Unlike both Instant-Expert Plus and LEVEL5/Mac, MacSMARTS does not include the ability to deal with variables (such as most strings and numbers). This has advantages and disadvantages. The primary advantage is that entering rules and designing knowledge bases are probably easier for a person with no programming background. Subject-matter experts sometimes find this kind of approach to expert-system design easier to understand. On the other hand, if we need to deal with information that can have any value in a range (or even any arbitrary value), such a design will not be suitable. For example, if we were designing a program to help us decide the best way to ship a package and we wanted one of the factors to be the weight of the package, MacSMARTS would not work as well as Instant-Expert Plus, LEVEL5/Mac, or another shell that supports variables. Instead of simply asking the user for the package weight and using that value to make a decision, with MacSMARTS we would be forced to ask the user to define ranges within which the weight might fall, or try to get to a proper weight range by successive approximation (Is it heavier than 2 pounds? Heavier than 10 pounds? Lighter than 5 pounds?).

One aspect of MacSMARTS that appeals to many expert-system builders is its easy-to-define links to other programs. Figure 11 shows how the designer can tell MacSMARTS, "If users say they don't know the answer to this question, link them to a HyperCard stack called 'Problem Definition.'" Links to other programs can be triggered by a Yes, No, or I Don't Know response. This makes MacSMARTS' interaction with the outside world powerful and easy to implement even for a nonprogrammer.

THE EXPERT EXPERT

The key criteria involved in determining whether a particular problem lends itself well to an expert-system solution are: the degree to which it requires intellectual activity (no such activity means a more conventional program will work fine), the degree to which it requires the type of intelligence limited to humans (any such need disqualifies it as a candidate), and the degree to which it will permit the sometimes less-than-optimal solutions presented by the workings of an expert-system's inference engine.

By seeing how these three types of shells work in some detail, you should have gained enough information to make an informed decision about which expert-system shell you should consider for your next AI project without asking your Mom or Dad.

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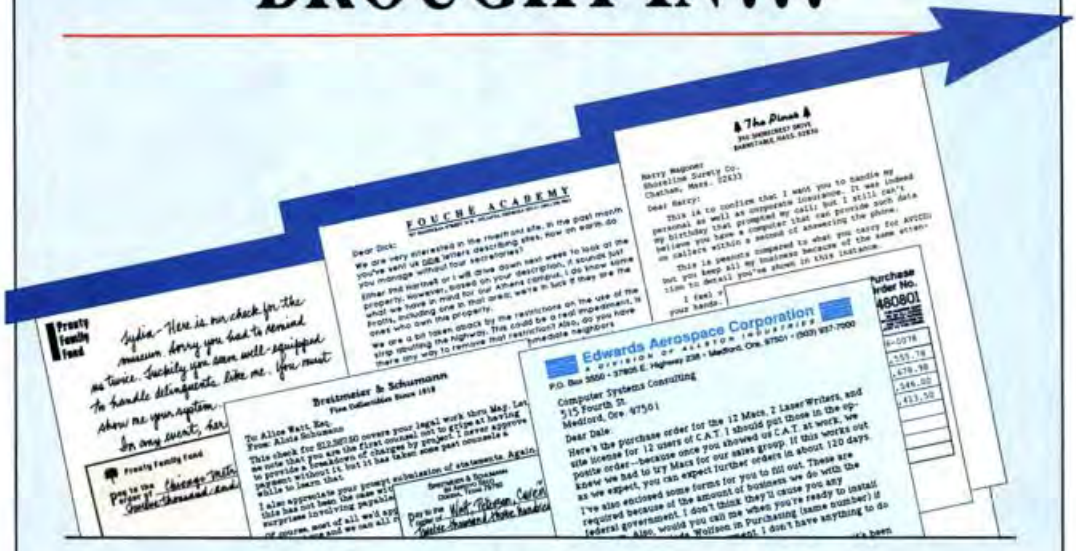


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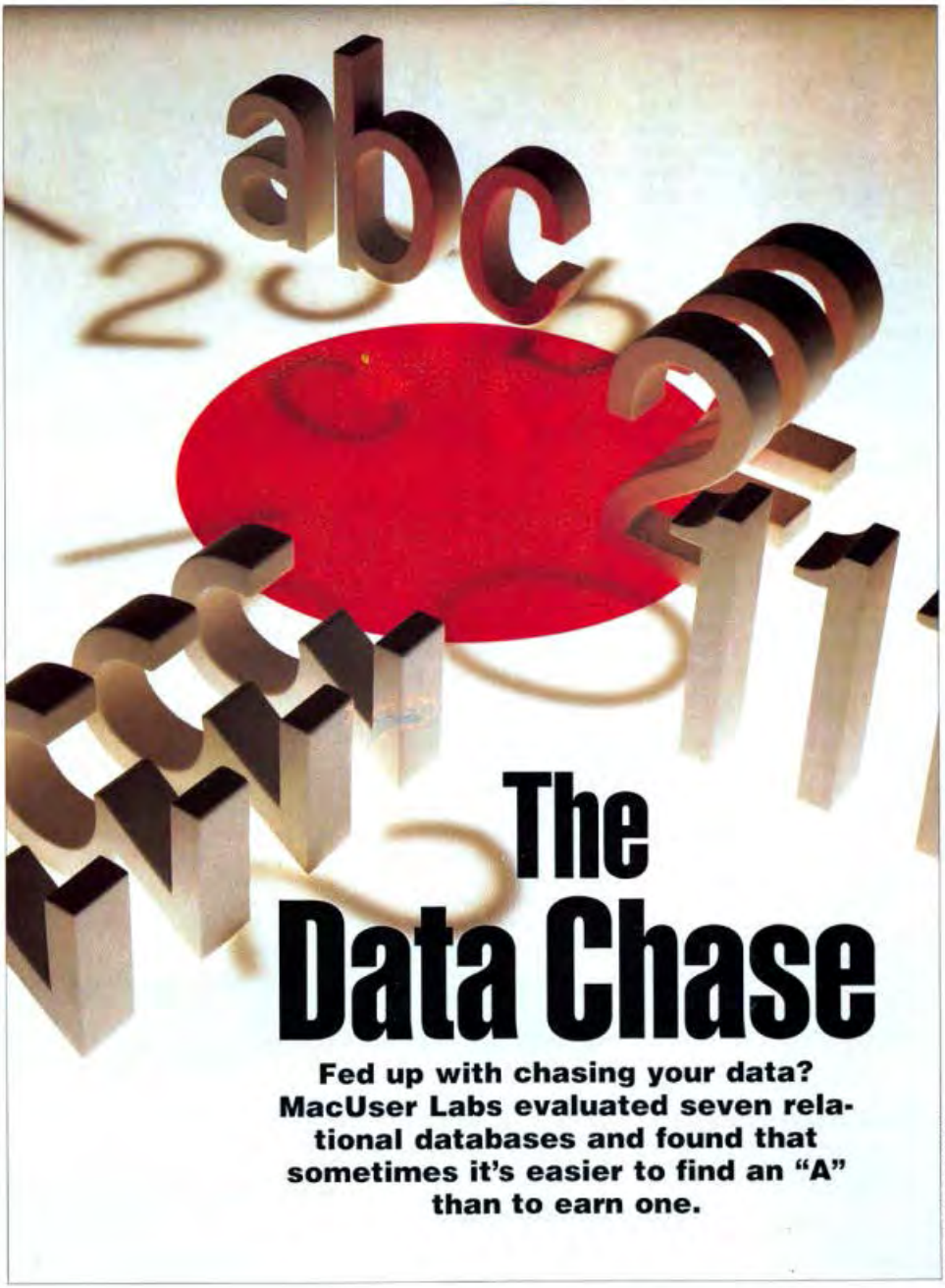


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The Data Chase

Fed up with chasing your data? MacUser Labs evaluated seven relational databases and found that sometimes it's easier to find an "A" than to earn one.

PHOTOS BY PETER GOULD/MACUSER



Database Comparison

By Jeffrey Young, Carl Warren, and the MacUser Labs Staff

Databases for the Mac have grown up, right alongside the machine itself. Today NASA can design the interior of a space shuttle with a Mac II, and you can run a business with an SE. But while desktop presentation and publishing get most of the attention, the real meat and potatoes of business computing is in databases, especially relational databases.

If you're still thinking of a database as a kind of search-and-retrieval engine for an electronic Rolodex, think again. Finding a single needle in a single haystack is a relatively easy task, something that almost any flat-file database can handle with ease and alacrity. The real game in business databases is relational, and here's where we separate the hay from the straw.

It may not be as thrilling as uncovering the next breakthrough in newsletter design, but the real business of almost every business is keeping track of orders, raw materials, finished inventory, customers, payables, and most important of all, receivables. With relational databases, we're talking about tools that directly affect the bottom line of almost every business. And what makes this so complicated is that in a real business all the separate files in a database like this must be dynamically related to each other — and therein lies the rub. If a customer is overdue on payment, the salesperson needs to know it when an order is entered. This is far more complex than it sounds.

This month MacUser Labs set out to take a long, hard look at the burgeoning relational database market and to test seven currently shipping products that we felt best illustrated the state-of-the-market. These companies and products include ACIUS' 4th Dimension 1.0.6; Ashton-Tate's dBASE Mac 1.01; Blyth Software's Omnis 3 plus 3.25; Borland International's Reflex Plus 1.01; 1stDESK Systems' 1stTEAM 4.0; Fox Software's FoxBASE+/Mac 1.0; and Odesta Corp.'s Double Helix II r49.

Our challenge to each vendor was the same: Create a mail-order application. In advance, we told them what we were going to test and how, as well as giving them a few requirements. This way we assumed that the application provided would be as error-free and streamlined as possible. We also wanted to reduce the chances that an inadvertent procedural or programming error on our part might unfairly penalize an application. After all, we reasoned, who should know the application better than the developers themselves?

There was good news, and there was bad news.

GOOD NEWS...BAD NEWS...

The good news is that some remarkably powerful relational databases are available for the Macintosh. The kinds of features and customizable procedural languages that made Ashton-Tate's dBASE family so successful in the MS-DOS world are now available on the Mac. With one or another of our tested databases, you can do almost anything you might want to with a relational database and more. This includes storing sound data, launching other applications from within a database, and having full interactive access to CD-ROM bases and HyperCard stacks. Even mainframe and minicomputer database standards like SQL (Structured Query Language) are starting to find their way into the Macintosh constellation. Apple's financial investment in Network Innovations' CL/1 server environment indicates the importance the company places on this end of the corporate database compatibility market. Mainframes aren't going away — Macs are gaining the capability to talk with them.

The bad news, though, is that the Mac's relational databases will never challenge IBM's dominance in the corporate database world until their performance can compete — no matter how remarkable the features and on-screen interface may be. A stripped-down PC/AT still runs circles around most Mac database applications. As we discovered, the most feature-laden, Macintosh-interface–adherent relational databases are also painfully slow at some essential tasks. Especially when you climb from 500 to 5,000 records, not to mention 50,000, which is by no means out-of-line if you're running a moderately sized manufacturing business.

If you refer to the performance results in our charts, you'll see that we're not talking about a difference of seconds but of hours — or even an entire day in one

case. This is an extremely significant issue if it's your machine that's tied up for three hours (in the case of dBASE Mac importing 5,000 records) while your boss is yelling for results. Mac users have the right to expect better than this from a robust database that they're going to bet the business on, and it's going to be hard to make a case for a company's conversion to Macintosh while this state of affairs persists. Nonetheless, our results do indicate that the tide may be turning.

In the past, poor Mac performance was chalked up to all that graphics overhead that a good Mac-like program had to carry, and there's some truth to that. However, the results posted by a relative newcomer, FoxBASE+/Mac 1.0, belie this and indicate that the combination of the Mac interface and advanced database features need not be gained at the expense of speed. FoxBASE+/Mac achieves its high speeds through a complex memory and processor optimization scheme, as well as an understanding of the strengths (and dare we say it, weaknesses) of the original Macintosh ROM.

Fox Software's success means that we can expect others to quickly follow suit. Enhanced versions of 4th Dimension and Omnis, as well as the untested McMax from Nantucket, promise to significantly address their problems vis-a-vis speed, and the advent of faster Macintosh CPUs will help as well. In the meantime, the capabilities of Macintosh databases, combined with the ease of use associated with the machine itself, make us bullish for the future even as we're twiddling our thumbs waiting for our machines to sort the data.

THE KNEE BONE'S CONNECTED TO THE...

The guidelines given to the vendors for developing our mail-order application minimized bells and whistles. Rather, we emphasized functionality. Specifically, we looked for a minimum operation that included the following:

- Creating a Customer file
- Creating an Inventory file
- Creating an Invoice file.

We considered the various questions and problems that might crop up as you use the software. While some issues are subjective — you might find a font used by the vendor displeasing — others, such as how the data is managed, require an understanding of the relational database-management systems (DBMSs) in general.

We also felt it necessary to break our approach down into three areas:

- Single-user, single-machine systems
- HyperCard environments
- Multiuser (networking) environments.

Within this report we look at all but the multiuser environment. Because multiuser database-management systems imply networking and remote communications, we've elected to provide this as a future report. While this necessarily limits our scope, it also saves us from having to consider one of the trickiest of database issues: data security and file locking. For the sake of this test, we assumed that the database and the program would reside on a single hard disk physically located at the test Macintosh.

Furthermore, we decided to test only two breeds of machine: the Macintosh II and the Macintosh SE. While accelerators can significantly improve performance on the Mac SE, there are so many varieties that their performance is the subject of a separate Lab Report. And while there are numerous Macintosh Pluses (and 512K enhanced, unenhanced, and even 128K models) still abroad in the world, they are unlikely to be entrusted to hold a company's essential data.

THAT OL' RAW DATA

First, you've got to get that old raw data into the machine, and once you've manipulated it and stretched it and pounded on it, you need to get it back out again in the form of a report that makes sense and persuades your audience of the truth of your conclusions. Here you would be excused if you just naturally assumed that Macintosh applications excel, though they do, in most cases. Most of the packages tested enable you to create input and output forms easily by dragging fields to the right location. Some, like 4th Dimension, will place the fields for you.

One of the requirements of our mail-order application is handling input screens and generating reports in the form of invoices. These packages provide a broad range of form-design tools. One of the features of Reflex Plus is the ease with which you can create simple to complex

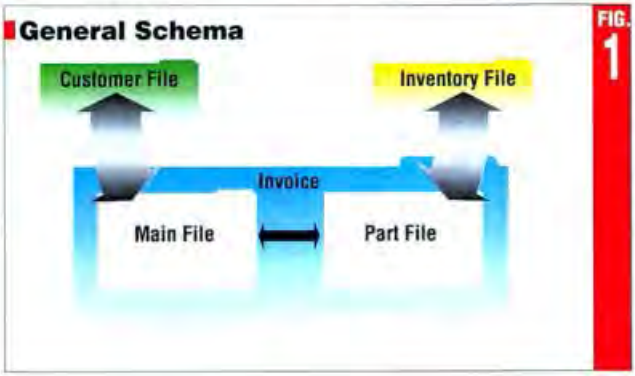


FIG. 1

Before a useful task-management system can be created, the overall structure — schema — must be outlined. The structure for the mail-order application is simple and involves only three entities (objects of interest): Customer file, Inventory file, and Invoice system, which is composed of an Invoice Main file and an Invoice Part file.

input and output forms.

Although the ability to use the Mac's visual capabilities is a compelling feature of many of the products tested, it certainly isn't the overriding factor for evaluating software operation. Rather, the fundamental goal in using a relational-database program is to ensure some level of data independence. Your main interest isn't in where or how the data is stored, but rather in how you can use it to accomplish a worthwhile task.

SCHEMA YOU, SCHEMA TWO

Should you be serving in the role of application developer, it's important that you know how the data is managed and what its overall structure is. In database parlance this is called the *schema*. A schema describes how entities — objects of some importance — relate as a group or collection.

Our mail-order application has three entities: Customers, Inventory, and Invoices. The general schema (see Figure 1) is simple. However, the complexity of the schema can grow to describe all the subobjects (see Figure 2) that help produce the application.

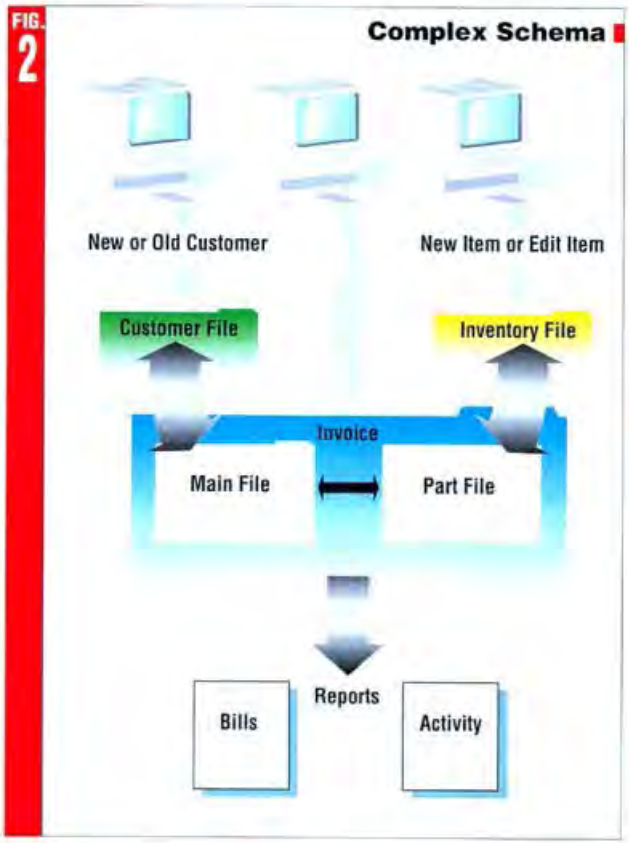
Notice that in our operation plan, the Customer entity interacts with a customer-entry module for new customers. The entry either creates a new customer record or retrieves existing information about an established customer.

Each customer is identified by an ID field (see Figure 3). The ID is a key field, that is, a field whose contents are unique for each customer. This field not only serves to identify the customer but also establishes a link to other components of the database schema.

The Inventory entity (see Figure 4), on the other hand, is independent of the Customer file.

The Inventory file is created by an inventory-update system that allows the entry or deletion of items and the editing of fields such as Price or Quantity.

The Inventory file described in our application also has provisions to include a picture of the part referred to. However, not all the products we tested were able to support picture fields. This feature is ex-



Each module within a schema can be thought of as consisting of sub- or support modules. Notice that our simple schema, when expanded, comprises a number of submodules that support the main entities. Each file has an entry module for adding or editing items. The Invoice system is supported by a report generator.

pected to become commonplace in products for the Mac, as will audio libraries, animation collections, and even video frames from laser discs — the right database for both today and tomorrow will have provisions to allow all different forms of data to be integrated.

The third entity in our schema is the Invoice. This is the part of our database that represents customer orders and is associated with generating bills and keeping track of what is paid — a matter of great importance in most businesses. An invoice (see Figure 5) consists of an invoice number, a customer ID, the date, whether the invoice has been paid, and a list of the parts and quantities ordered.

If we represent this entity by a single file, the same invoice number, customer ID, date, and record of payment must be repeated for every new line item on the invoice, to establish the proper relationship of customer to inventory item (see Figure 6). The results are a record larger than necessary, a high probability of an error, and overly cumbersome relationships to manage.

In our schema, we eliminate this redundancy by using two files for invoices. The Invoice Main file contains the Invoice Number, Customer ID, Date, and Paid fields, while the Invoice Part file repeats the invoice number together with the part numbers and quantities ordered. As a result, the customer ID and invoice date are not repeated for each part ordered (see Figure 7). The Invoice Number field is common to both files and relates the information contained in them.

FUNK & WAGNALL'S DATA DICTIONARIES

The purpose of a database-management system is to provide a cohesive way to handle information. The overall schema establishes the general flow of the data-management task, and the data dictionary describes the details of the implementation.

The data dictionary is a convenient name for the structural definition of the files and their fields, including sizes, keys, and any special functions such as adding a picture to the inventory item. In classic

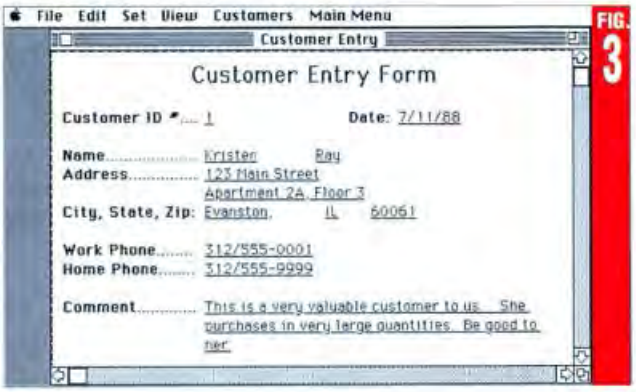


FIG. 3

The Customer file is composed of fields that identify the customer. The ID is a key field and is unique to each customer. It serves as a link to other entities within the database. This screen is from Double Helix II.

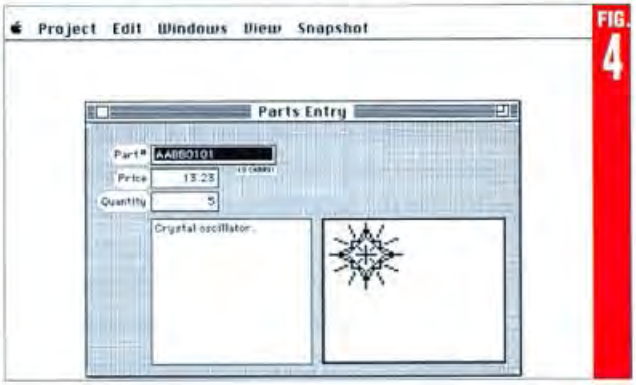


FIG. 4

The inventory, like the Customer, file takes on the appearance of a table that identifies the components of the inventory. The Part Number is a key field that is eventually used with the invoice to establish a relationship to a customer. This screen came from dBASE Mac.



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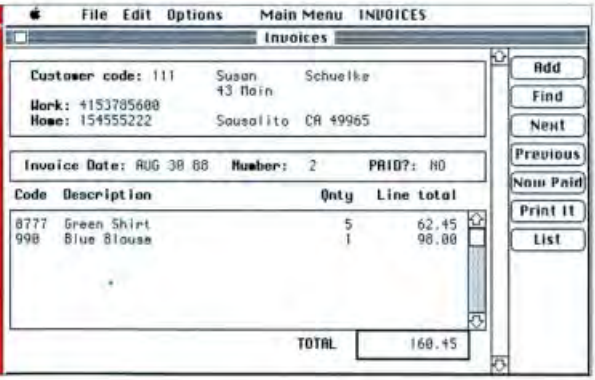
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FIG. 5



The invoice system is very simple, consisting of an invoice number, customer ID, date, part numbers, quantities ordered, and whether the invoice has been paid. All other information, such as total price, can be calculated from these values using the Customer and Inventory files. Omnis 3 plus generated this screen.

databases (such as those that work on behemoth IBM mainframes), the separation of data from operators increases security and limits corruptibility. Unfortunately, none of the products we tested fully supports data dictionaries.

The dictionary can serve a major role. It stores data definitions, generation of procedures, data validation, and security requirements. The latter, at least for our purposes, involves password protection for the opening of a file or the changing of a particular field's contents.

The data dictionary description may, and frequently does, differ from the visual depiction of the data form, and from product to product. For example, the field name *Cust_no* in the dictionary most likely will take on the more elegant name of *Customer Number* on the input and output forms.

HyperCard, the Visual Database



Look! Up on your Macintosh! It's a database! It's a new Finder! No, it's HyperCard!

Confusion over what HyperCard really is has reigned from the introduction of Apple's most successful new software product since MacPaint. In part, the confusion is caused by Apple, which chooses to position HyperCard as system software and must therefore studiously avoid calling it a database manager or anything resembling such an animal. But another reason for the confusion is HyperCard's chameleon-like nature. It can be almost anything you want it to be.

In the world of databases, HyperCard can be seen as a DBMS of sorts. It lacks some features (such as sophisticated reporting) but boasts some (its high-speed and flexible Find command, for example) that far more expensive database systems omit. Relationality is tough to get with HyperCard; it requires the user or designer to do some programming (or scripting) in HyperTalk, HyperCard's built-in language.

Reporting in HyperCard has become significantly faster and more flexible thanks to Reports for HyperCard from Mediagenic's TENpointO Division (formerly Activision). This stand-alone program enables you to design graphically interesting report layouts using MacDraw-style tools and to program the reporting parameters from within HyperTalk.

The most interesting and latest way HyperCard fits into the world of databases is as a flexible graphic front end to other DBMS packages, even those residing on other computers. One of the hottest announcements at the Macworld Expo in Boston this summer was ORACLE for Macintosh. Oracle Corporation showed off a highly graphic front end to a network of relational databases managing a simulated hotel chain. ORACLE databases can be accessed and updated from within HyperCard stacks incorporating the company's Hyper*SQL product. These databases can reside on mainframes, minicomputers, UNIX workstations, and other microcomputers.



Oracle's HyperCard front end applied to mail-order database.

Other databases on large computers can be accessed through HyperCard front ends. Network Innovations' CL/1, for example, has a HyperCard interface to DEC VAX-based databases. Unlike ORACLE, however, CL/1 does not run on the Macintosh itself.

Look for HyperCard interfaces directly to such established Mac databases as 4th Dimension and Omnis 3 plus. Still other products to come will include interfaces to these databases through the industry standard SQL (Structured Query Language) front ends now available for other DBMS packages such as ORACLE.

— Dan Shafer

Initial Invoice Design

Invoice No.	Customer ID	Date	Paid?	Part No.	Quantity
101	567	7/1/88	No	522	3
101	567	7/1/88	No	35	1
101	567	7/1/88	No	277	10
102	331	7/5/88	Yes	69	2
102	331	7/5/88	Yes	665	1

FIG. 6

This schema for an invoice file is a poor design. The Customer ID, Date, and Paid information must be repeated for each item ordered in the invoice. We eliminated this redundancy by representing the invoice entity as two files.

Final Invoice Design

Invoice Main File

Invoice No.	Customer ID	Date	Paid?
101	567	7/1/88	No
102	331	7/5/88	Yes

Invoice Part File

Invoice No.	Part No.	Quantity
101	522	3
101	35	1
101	277	10
102	69	2
102	665	1

FIG. 7

By breaking an invoice into two files, an invoice Main file and an invoice Part file, we eliminate the need to repeat the Customer ID, Date, and Paid information. The Invoice Number establishes the relationship between records in the two files.

GIGO GOES HAWAIIAN

An important factor you need to consider is the quality of the data. The old adage of garbage in/garbage out holds true. But carefully designed integrity constraints can minimize the amount of garbage collected.

To illustrate, consider the entry of various inventory items in the invoice. To be valid, the inventory item must exist. The same holds true for a customer. Entry of an invalid customer ID or part number should result in an error. Similarly, an attempt to enter an invalid inventory item or to use an incorrect sequence should result in an error. This is managed by the definitions set up in the dictionary or by the associated procedures.

HAVING A RELATIONSHIP?

You can think of the data we are collecting as being a series of tables consisting of Customer file, Inventory file, Invoice Main file, and Invoice Part file. In relational database theory, each table is a relation, and key fields that appear in multiple tables provide the basis for the relationships.

Key fields are the glue that allow relations to be defined. The presence of a common key field in two tables creates an implicit link between them. For example, the Customer ID field in the Invoice Main file links that invoice to the corresponding Customer file entry. Here, the customer ID is a foreign key when it appears in the Invoice Main file, because it is actually created and defined in the Customer file, then referred to within the Invoice Main file.

All the products we tested (with one exception) required that some physical link be made between related files — in other words, that the database-applications developer specifically flag the relation. The only DBMS we tested that did not require this was 1stDESK Systems' 1stTEAM.

Because of the explicit links required, the databases we tested are not truly relational, according to the relational-database model postulated by Dr. E.F. Codd, a pioneering relational-database theoretician.

Codd suggests that data should remain independent and that queries of the data should automatically reference common key fields between files, with no explicit links. It's a nice idea, but it's not one that is easy to implement efficiently.

SORTING YOURSELF OUT

Creating the data definitions and establishing the database is only a small part of the database manager's job. In most cases, you want to be able to retrieve the data in some logical or ordered format. There are basically two ways to achieve this: sorting and indexing.

How well a DBMS manages these tasks tends to be a key point of benchmarking, and the performance chart shows how the

seven products we reviewed stacked up. But in fairness, how well a DBMS sorts or indexes depends on how large the files are and how many ordered relationships are made.

You might want to index on the customer ID, inventory items, billing date, and even invoice total. This allows you to view the data in a variety of ways.

Ordering of the data permits fast access to it and allows the creation of useful reports. Sorting is one such ordering method but typically tends to be time consuming and has to be done each time a change is made in the database. Basically, a sort is used to order the data in some specific manner for a specific purpose. For example, you might want to print all the company names by zip code order, lowest numbers first. Or for perversity's sake one day you might invert the data by last name, going from Z to A. You could also index the data and then sort the index in descending order. It depends on your application needs.

Indexing, an ordered representation of the data by one or more desired items, is a powerful tool that represents a half-step towards sorting. In most of the programmable database managers we tested, multiple indexes can be created and opened.

Making a change to the database does not require that the data be resorted; instead, the file's indexes are automatically updated. This allows the program to short-circuit a full sort by making use of pointers — the index — to locate certain data.

HIGH PERFORMANCE

As part of MacUser Labs' evaluation, we developed a series of tests to determine how well each of the programs performed. Specifically, we decided that we would measure performance based on commonly encountered transactions, including data import, data manipulation, and queries.

To ensure commonality in the testing base, we used the mail-order applications that each manufacturer developed. Although we asked each company to minimize the number of bells and whistles used in the application, features unique to its product could be used where appropriate.

The application test model consists of four principal files: the Customer file, Inventory file, Invoice Main file, and Invoice Part file.

THE MECHANIC'S SHOP

To emulate the type of equipment you might be using, we created two hardware test environments.

As shown in our results, these consisted of a Macintosh SE and a Mac II. The SE had 2.5 megabytes of RAM and the Mac II had 5 megabytes. The SE was equipped with a CMS Enhancements PRO45-SE/R 45-megabyte hard-disk drive and was running System 4.2. The Mac II sported a Jasmine Technologies Direct Drive 100-megabyte hard-disk drive and ran System 6.0. We made no other special hardware provisions.

To avoid timing flaws caused by disk fragmentation, we reformatted the hard-disk drives between program tests. We used the HD Tune-up program, which is part of the Symantec Utilities for Macintosh package, to check disk fragmentation and optimize the files.

Additionally, we turned the computers

Yet More Databases...



Several databases weren't covered in this report because they were not available at press time. Among these are McMax by Nantucket and dBMAN-MAC by Versasoft, two dBASE clones that were scheduled to be upgraded late this year. Other products were not tested because they either are not relational or were designed specifically for a particular task.

McMax is compatible with Ashton-Tate's dBASE III PLUS. Applications developed on a PC with dBASE or on a Mac with McMax can run on either machine with little or no modification. The Macintosh interface is greatly enhanced in the new release, which adds such features as programmable hierarchical pull-down and pop-up menus, as well as serial-interface (modem port) support. Nantucket claims that the McMax upgrade is faster than FoxBASE+/Mac. The new release, at press time expected in the fourth quarter, is priced the same as the previous version, $295.

dBMAN-MAC, version 5.0, runs on 13 operating systems including the Mac OS, DOS, and several versions of UNIX. It is the only DBMS on the market that's compatible with both dBASE II and dBASE III PLUS, with several interface features of dBASE IV. dBMAN does not use a Macintosh interface but has pull-down menus and windows. dBMAN-MAC retails at $189 for the single-user version and $499 for the multiuser version.

FileMaker II is the latest incarnation of FileMaker, released in September by Claris, which acquired Nashoba Systems and the popular DBMS.

Although FileMaker II is a flat-file database system, it does have some relational features. A file has the ability to look up and read information from other files. FileMaker II is multiuser, and the lookup file can even be located on another workstation on the network.

FileMaker II, which Claris says is a repackaged version of FileMaker 4, retails for $299. An upgrade from earlier FileMaker versions costs $50 for registered users.

Panorama, from ProVUE Development, is based on the company's Overview program, which it replaces. Panorama is described by the company as "partially relational," in that you can do lookups between files but can't link files as in other relational database-management systems. It is priced at $395, and Overview users can upgrade to Panorama at a price undetermined at press time.

C.A.T. (Contacts, Activities, Time) by Chang Laboratories is a relational database originally designed for sales and administration. This is a relational DBMS for nontechnical users. You can remove the shrinkwrap, plug in the software, and start entering data. You don't lay out fields, and there are no design and user modes. Instead, there are three components that are used to manage information in an integrated fashion: Contacts, Activities, and Time. This allows you to file information by company, subject, and date, for instance. The most recent update is version 2.0, priced at $399.95

— John Rizzo

off between test procedures to ensure full RAM flushing. Although performance can be enhanced by using the RAM cache, we turned it off at the Control Panel.

Because we were measuring how long it takes to import and order data, we chose two sizes of data files for each test. The small database contained 500 records in the Customer file, 100 records in the Inventory file, and 100 records in the Invoice file. The medium database contained 5,000 records in the Customer file, 300 records in the Inventory file, and 300 records in the Invoice file.

In addition, for those of you who need to handle large data files, we created a 50,000-record file. Because of this file's size, we used it on the Mac II only.

AT LAST...THE TESTS

While many of you are first-time users of database software who'll be creating new records, some of you might want to import records from a foreign database.

Therefore, we viewed this as an important function to test.

We also tested how well each program ordered the data. Specifically, we established an ascending sort on the nonindexed Last Name field of the Customer file. We felt this would give us a good indication of the database engine's performance.

Indexing — ordering data on a field or fields — is an important feature of database managers. So that we would have a common base of comparison, we indexed the last name in the Customer file and timed how long reorganizing the data took.

The main reason to order the information in a database is to make it easier to locate. How fast a given record can be located is another function of performance that we measured.

A common practice is to find a single record. Querying the Customer file for a single customer was relatively easy and quick with all the database packages we tested. The search was performed on an indexed field. Unfortunately, Reflex Plus crashed when we tried to perform a simple search on the 50,000-record file. You should therefore be wary of Borland's claim that Reflex Plus files can contain an unlimited number of records.

A much longer search was performed on a nonindexed field, Quantity, in the Inventory file. This search looked for all occurrences of parts with a quantity of less than 15 pieces.

The report used in our tests uses information from all the tables in our application. Reports were generated by searching for all the customers who purchased a particular part.

Databases tend to change. Consequently, a facility is needed to delete items or revise them. Most of the products tested allow you to select a record or file and then to delete it. We deleted multiple records by removing all customers older than a fixed entry date.

Infrequently, you may find that you need to make changes in your data files that will affect a large number of records. When that need arises, it's time for a global change. Considering inflation, one change that might be required is a price increase. We changed the price of all parts in the Inventory file to represent an increase of 4 percent.

AND THE ENVELOPE, PLEASE...

For speed, the results proved FoxBASE the clear leader. Of the 35 tests, FoxBASE yielded the fastest times for 26 of them (it tied for the lead in five). In 20 of these, it was at least twice as fast as the next-fastest database. Omnis 3 plus won three

Multiuser Management



Several of the major database-management systems on the market are offering multiuser versions, allowing several users on a network to access the same file at the same time. This is useful for a large database that can't be stored on local hard disks or for one that is being frequently updated.

The problem with this scheme is that the speed of a database is limited to the speed of the network. If the network is based on the AppleTalk hardware built into your Mac, the top speed is 230 Kbits per second — painfully slow for many database operations. Macs connected to Ethernet via internal cards (at $800 per station) will be faster, but in both cases the speed will decrease with increasing network traffic. Speed is further slowed with increased access to the file server and competition with nondatabase activities. A working solution, if your database is not too large, is to download the database periodically to your local hard disk, where you will find performance increased by orders of magnitude.

Among those products that are multiuser or offer multiuser versions are Helix, 4th Dimension, Omnis, 1stTEAM, FileMaker II, and dBMAN-MAC. At press time, FoxBASE was expected to have a multiuser version by October.

Most multiuser databases put a copy of the application on the network file server. The application processes the users' requests for data, and the file server sends it out. For networks with both Macs and PCs, some databases will require that both the PC and Mac versions reside on the server.

4th Dimension works differently in that only the data resides on the server, with each workstation running its own copy of 4th Dimension. This can get expensive, as you will have to buy a 4th Dimension for each workstation. But by not having the application on the server, you eliminate the risk of bringing the server down with an application crash.

FileMaker II works both ways: You can put the application on the server or on the workstations. Claris says that performance is better with the latter setup. However, multiuser FileMaker II doesn't need a server at all. It has its own built-in file-server software and will work on an ordinary LocalTalk network. FileMaker II supports an unlimited number of users. Like 4th Dimension, all versions of FileMaker II are multiuser.

Keep in mind that the test speeds given in this report are for single-user versions. On a standard LocalTalk network, these speed variations will make little difference. A future MacUser Labs report will test how well each multiuser database works within the constraints of AppleTalk.

— John Rizzo

A/UX (UNIX) Impact on DBMS



Recent months have seen the appearance of Macintosh A/UX versions of many database systems with substantial reputations in other computing environments. Companies of the stature of Oracle (Belmont, CA), Relational Technology, Inc. (Alameda, CA), Informix Software, Inc. (Menlo Park, CA), Unify Corporation (Sacramento, CA), and Progress Software (Boston, MA) have placed their database might behind the A/UX bandwagon.

The Mac II is powerful enough to run these more sophisticated database products under A/UX. Apple's move to embrace an open architecture for the Mac by implementing UNIX as an optional operating system is paying off in the database arena.

Government and education institutions now generally mandate UNIX for all computing environments, including DBMS. The business community is also building its next-generation DBMS strategy around UNIX. Apple has positioned the Mac to be a player in this coming generation of database computing.

The current downside of A/UX for Mac database users is a time warp back into UNIX's 20-year-old character-oriented, line-oriented interface, which uses a cryptic command syntax. Apple will have to provide A/UX DBMS vendors with the complete Mac toolbox so these vendors can develop an interface for their products that will delight Mac users who are not also UNIX hackers.

DEC and Apple have entered into a strategic relationship to create connectivity between their architectures. Connectivity between the companies' computers really starts to make sense under UNIX. A DEC VAX running ULTRIX (DEC's version of UNIX) and a Mac II running A/UX are very similar environments. Every database vendor with an A/UX version also has an ULTRIX version. This adds a source-level compatibility between DEC and Mac database applications.

This source-level compatibility is usually in the form of a data dictionary that defines the database file structure combined with application programs written in a fourth-generation application language (4GL). A 4GL is a high-level toolset that interacts with the DBMS to create a user application. It has more sophisticated application logic than is found in BASIC or COBOL, which greatly reduces the lines of code required to produce an application.

SQL is a subset of a typical 4GL that is used specifically to access relational databases. However, it lacks the power to develop complete applications. SQL has no capability to generate screens or reports, nor the ability to process complex application logic. Vendors of fourth-generation languages add these capabilities to SQL (or a similar proprietary data-access language) to provide developers with a complete application environment.

The A/UX market will mature rapidly. The greatest power of A/UX for Mac database users is that at some point, operating under a layer of Macintosh interface, it will deliver the advantages of industry-standard UNIX transparently.

— Richard A. Skrinde

of the contests, and Double Helix won one.

The most consistently slow program was dBASE Mac, which had the slowest time 17 times out of 35. One has to wonder what Ashton-Tate expected to gain when it decided not to make dBASE Mac compatible with its IBM PC-based product's programs — especially since FoxBASE offers full dBASE program interoperability with excellent speed. The second slowest was 4th Dimension, which had the slowest time on 11 of the tests. ACIUS has promised a 5- to 40-fold speed increase for the 2.0 release due by the end of the year, which would heat up the competition markedly. FoxBASE was the only product tested that never came in with the slowest time.

While speed is certainly an important consideration, especially with large databases of tens of thousands of records, there are other considerations. 4th Dimension is still one of the most elegant programs. Its built-in features for both programmer and user automate many tasks in creating and using a database application. Although FoxBASE comes up with improvements almost weekly, its report generation is still lackluster. The next version promises more sophisticated graphics form-designing tools.

Helix is an interesting program to work with. The lack of a programming language limits its power, but for the right application it almost makes using a database enjoyable. The program's visual interface is easy for someone who doesn't program databases — a normal user — to learn, and the program's powerful capability to share data and programs as-is with the company's DEC VAX application could prove an important consideration in years to come.

Another product with a good basic user approach is Reflex Plus, which has the added attraction of having the lowest price of the seven packages we looked at. For those who feel their needs don't require a relational database, it might be worthwhile to consider FileMaker II, which is almost as simple to use as the word-processing program MacWrite.

In summary, high-end Macintosh relational databases probably boil down to FoxBASE and 4th Dimension, with Helix an honorable mention for its bold effort to use the Macintosh's visual metaphor to the fullest. All three can be used to create powerful and advanced applications. Experienced dBASE programmers and many others will prefer FoxBASE, especially since the program opens the door for full database application and data integration with existing dBASE environments.

On the other hand, there is still just enough of the scent of MS-DOS about the program (FoxBASE was originally sold as an IBM PC product, a clone of dBASE III PLUS) that Mac purists could take offense. These Mac users and non-dBASE–oriented database aficionados may still prefer 4th Dimension, which takes absolutely full advantage of the Macintosh operating environment while providing a comprehensive programming environment capable of doing just about

anything a Macintosh database could ever be called upon to perform. Unfortunately, the program's speed performance is not as distinguished as its feature set. For those who don't want to take a course (or series of them) in advanced database design yet want to create a powerful application, Double Helix might just be the ticket...especially if a couple of VAXs are hanging around the work site somewhere.

The winner of the Mac DBMS race will be decided within the next year. For speed and the integration of a Mac database into the dBASE world, FoxBASE+/Mac has the lead; for features and power, 4th Dimension is ahead; and for ease of use, Double Helix II is running in its own lane.

Fox Software needs to work on its interface, adding more Macintosh functionality, while ACIUS desperately needs to come up with its promised performance enhancements. If none of them trips, it might be a photo finish. ■

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Capsule Reviews



Ashton-Tate Corp.
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Torrance, CA 90502-1319
(213) 329-0086

dBASE Mac

dBASE Mac is Ashton-Tate's relational database for the Macintosh. You might expect that there would be some similarities between the Macintosh version of the product and the PC version. dBASE Mac is an entirely different dBASE, though, and although you can import dBASE III PLUS data files, programs written in the widely used PC dBASE language are not compatible.

Ashton-Tate ties the database management closely to the computer's file system, thus all the burden is on you to ensure the integrity of the data files and naming system. dBASE Mac stores each data file as a single physical file. This creates a direct relationship between the logical entity and the physical file, so changing the name of the physical file will destroy the relationship of the group of entities. The documentation does warn about this.

The setup or data dictionary is called a *project*. Within the project are all the input and output definitions, procedures, menus, and tools that you might want to use. File creation is simple, and you are guided by dBASE Mac through the process.

dBASE Mac uses the visual interface to create input and output screens and to establish various relationships between files. The relations are created by drawing a line between the related items (see Figure 1).

Although this appears simple, handling the lines is difficult, and it appears that limitations exist, especially if lines have to cross.

It is possible to create an entire application in dBASE Mac without using the procedural interface. This programming language bears no resemblance to that of the PC version, so programming experience in dBASE III PLUS will be of little benefit.

dBASE Mac supports both sorting and indexing. A sorting feature we liked was that dBASE Mac doesn't reorder the entire file but creates an ordered table of the key fields. This not only speeds up the opera-



FIG. 1

tion but also uses little space.

Ashton-Tate supplies plenty of helpful documentation with dBASE Mac. The only trouble we ran into was during the startup sequence. At first glance it seems that you don't need a hard-disk drive. You do. When you first start dBASE Mac, you're asked to fill in an on-screen registration form, entering the software's serial number as the validation key. A mistake causes the program to reload.

Because dBASE Mac tends to be disk-intensive, you'll want a fast, large hard disk. Additionally, the disk should be optimized to reduce fragmentation. We discovered that performance was affected by about a factor of four by heavy disk fragmentation.

dBASE Mac isn't necessarily the optimum product for serious database users on the Macintosh. It's not a bad solution for midrange applications, such as maintaining occasionally accessed data. dBASE Mac lists for $495. ■

Double Helix II

Double Helix II is a nonprocedural (no programming language) database that's both powerful and fun to use. Double Helix II does everything a good Mac database should do. It permits graphic free-form entry screens and reports, and it lets you use graphics in records. Double Helix II uses icons to accomplish what you would normally do with a command language (see Figure 2).



Odesta Corp.
4084 Commercial Ave.
Northbrook, IL 60062
(312) 498-5615

A User's Guide and a Reference Manual are included. The documentation is good overall, but finding a subject in the index is sometimes difficult. For example, although there is no real sort command, we felt the index should contain a reference to sorting.

You start with a *collection*, which is another name for a database. The collection holds relation icons (files), which when opened reveal more icons called *tiles*. Tiles are used to define field types (Field icon); perform manipulations, calculations, and program flow (Abacus); design forms and reports (Template), create indexes (Index), and create queries for data retrieval (Query). The Posting icon is used when you want to update more than one relation at once. For example, when a part is ordered, it should be subtracted from the Parts-on-hand field in the Inventory relation. The View icon lets you combine other icons and produce forms for input or output.

Customized applications are easily created with the User icon. Menu items are simply dragged from the user well to the appropriate menu bar. Password protection allows for different levels of involvement by different users.

Odesta has a nice line of Helix products, including a multiuser version of Double Helix II that costs $395 for four users. Additional nodes are $150 each. Helix VMS allows you to run Helix applications in a DEC environment.

If used in the right environment, Double Helix II leaves little room for complaint. This icon-driven database is very nice, but a screen full of icons could become unwieldy in a complex application. A large screen would be helpful, along with a view-by-name option. Furthermore, we feel Helix might be more appropriate to a data-retrieval application such as a bibliography than to a computation-intensive application such as a point-of-sale system. The variable-length fields, such as those 4th Dimension provides, make for smaller disk files, but they tend to slow things down. Double Helix II is no speed demon, and it came in below average in the performance tests.

We used version 49 for our testing. Version 51, which should be shipping soon, adds new error-handling routines. Version 52 will add MultiFinder compatibility.

Double Helix II retails for $595. ■

FIG. 2



1stTEAM

1stTEAM is a fixed-field database package from 1stDESK Systems. It is one of a family of products including 1stFILE, 1stSCAN, 1stMERGE, and 1stPORT. 1stTEAM suffers from some severe limitations. There is no unique key field to identify a record, and indexing is not supported. The ability to handle only 32K records further limits its usefulness.

1stTEAM refers to the structure of a data file as a *blueprint*. For example, to define the Customer file, a blueprint would be created and each field defined. The only data types allowed are text and number. The date, comment, and picture types common to most of the other Mac databases are not supported. By Mac standards this is a rather primitive database; there is no control over fonts, graphics, or layouts of forms and reports. Add-on products 1stSCAN and 1stMERGE compensate for this deficiency by enabling you to use scanned images or MacWrite documents as forms.

1stTEAM handles relations between files with a Join operation, rather than through explicit links (see Figure 3). For example, Joining the Customer file with the Invoice Main file with the Customer ID field produces a combined file that has complete customer information along with the invoice number and date. Using a Join rather than explicit links fits the relational model well, but this is meaningless without the notion of a key field. Additionally, a complex query that requires Joining several files can produce intermediate files larger than the original database. An expert user can usually avoid this problem, but the documentation does not mention it.

The programming language consists of macro HyperAccess commands that can be linked together. These macro documents can be launched from HyperCard. Even though there is no provision for exchanging data with HyperCard stacks, snazzy front-end screens can be incorporated into an application.

Four selections are available under the HyperAccess menu: Hyper-Report, Hyper-Join, Hyper-Append, and Hyper-Duplicate. Any data manipulation through the use of macros, combination, linking, or copying can be executed by opening a stored file. Moreover, HyperAccess files can be linked to produce an end product such as a printed report or invoice file, even when the files containing the original data must be taken through a series of steps. However, editing a multiple-step program is difficult because each step resides in a separate document.



FIG. 3



1stDESK Systems, Inc.
7 Industrial Park Road
Medway, MA 02053
(617) 533-5691 or (800) 522-2286

The documentation we received came partially on disk but was otherwise quite readable and complete. There is a very good on-line help system. 1stGATE, a product still in beta when this report went to press, should allow for a remotely accessible database. For example, salespersons interacting with a centrally located 1stTEAM database could perform look-ups and transfer data.

We feel that, at $795, 1stTEAM is a bit overpriced for its functionality compared with the other databases tested. ■

FoxBASE+/Mac

FoxBASE+/Mac currently outperforms all other Mac databases in terms of raw speed. It started as a cloned version of Fox Software's popular PC product (which is itself a clone of Ashton-Tate's dBASE III PLUS) but has since evolved into an independent Mac product that takes full advantage of the Mac's user interface. At the lowest level, FoxBASE+/Mac operates with command lines, which can either be typed into the Command window or built with the aid of the various dialogs. Even command lines that are generated using the more Mac-like features, however, still appear in the Command window. This has many advantages. By keeping a protocol of the commands previously executed, you can retrace your steps while maneuvering through your data.

The Command window can also function as an application generator. Automating database procedures is extremely simple. Using the Command window, you can select the commands to be automated, copy them onto the Clipboard, and paste them into a FoxBASE+/Mac program file.

The documentation is a functioning mixture of the standard "how-to-use-this-

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Bernoulli removable Disk Cartridges provide infinite data storage capacity.

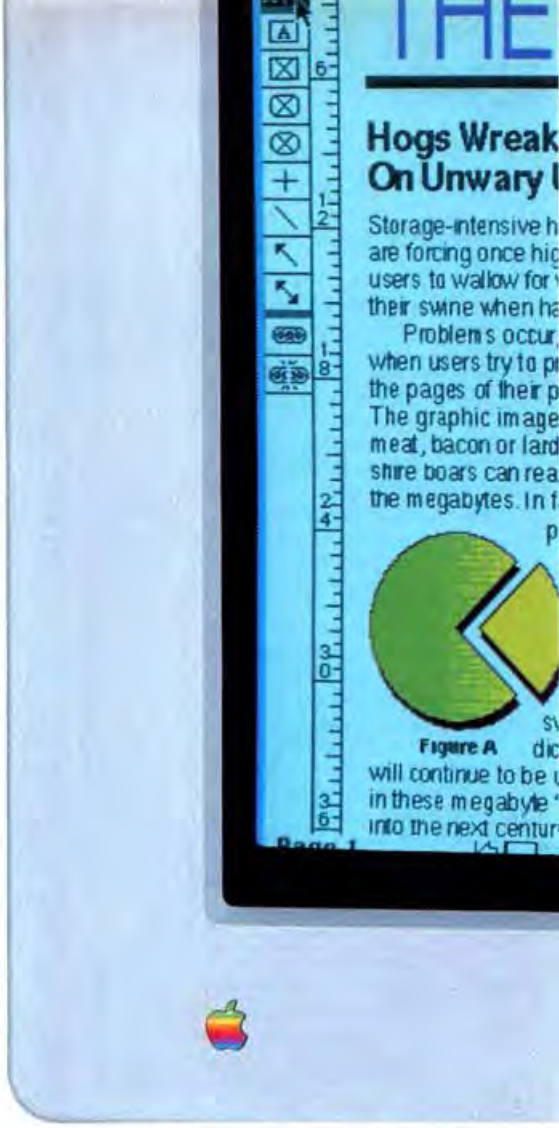
PERFORMANCE. Bernoulli offers high-performance, removable mass storage systems for the Mac. Unlimited primary storage systems with performance that compares to better hard disks (‹40msec access time). And if you already have a hard disk, Bernoulli provides infinite extended storage capacity. So you can store and manage your projects on 20MB removable Disk Cartridges easily and inexpensively as you see fit. With increased on-line capacity plus never-ending additional storage at your fingertips.

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Bernoulli lets your Mac exchange data with PCs and PS/2s.

it with you. In effect, you retain absolute control of your files. And what could be more secure than that?

CONNECTIVITY. Finally, there's one more Bernoulli benefit you should consider: Bernoulli Disk Cartridges are transferable between the Macintosh™ and PCs and PS/2s.™ So you can now exchange files with the IBM® world as much (or as little, for that matter) as you like. Bernoulli provides the missing link. What else would you expect from the number one company in removable mass storage? So roll your megabyte hogs and your other storage problems into one low-cost solution. Bernoulli Boxes for the Mac are available in three models, in 5¼" and 8" form factors. For more information, see your Iomega Authorized Reseller, or call 1-800-346-6655.

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Fox Software, Inc.
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database" and a language reference. A detailed explanation of each command can be found in the language reference, and the on-line help system makes the handbook almost superfluous. On-line help contains descriptions of all the keywords as well as the available menu selections. When you double-click on a selection, the program provides even more detailed information.

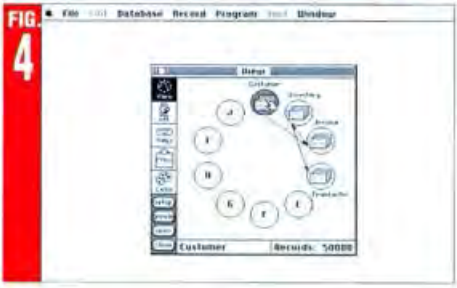
On the purely Mac side of things, FoxBASE+/Mac has a number of well-thought-out features that make it both fast and easy to use. The Expression Builder dialog is integral to many of the functions accessed through the Mac interface. It lets you build complex expressions by making choices from pop-up menus and field lists. For nonprogrammers, and often for programmers as well, this is a very clear, time-saving way to set up expressions. The Browse feature brings up a window that displays all of the current database, or just selected fields, in a row-and-column format.

A good example of a feature that can exist only on a Mac is FoxBASE+/Mac's View window (see Figure 4). It offers a graphics approach to viewing and relating databases. Databases can be loaded into ten work areas, A through J. The databases can then be easily referenced by the letter of the slot they are in. Relating two databases simply involves dragging one segment to another and specifying the field common to the two databases in the Expression Builder dialog. When the relation is complete, an arrow appears between the two related databases. An indexed database is identified by a pointed finger in the segment of the indexed database.

FoxBASE+/Mac offers many types of compatibility. It can use dBASE III PLUS files without modification, and its language is a superset of the dBASE III PLUS language. The language of FoxBASE+/Mac also contains extensions to support the Mac interface. For example, ALERT is a keyword that causes an alert box to pop up.

The program performs very well, and its already effective interface is constantly being enhanced. Release 1.1 includes sophisticated graphics form-designing tools as well as further "Macification" of the generic interface. Priced at $395, it's a database package that's hard to beat in today's Macintosh marketplace. ■

FIG. 4





ACIUS, Inc.
20300 Stevens Creek Blvd., Suite 495
Cupertino, CA 95014
(408) 252-4444

4th Dimension

A strength of 4th Dimension is that users without any database programming experience can create simple relational databases. At the same time, experienced programmers can create powerful applications with the rich programming language and helpful tools. In both cases, the database user gets an intuitive interface.

The environment uses three modes: the Design mode, the User mode, and the Custom mode, where custom applications are run. Many user features, such as import/export, query, sorting, and report generating, are built into the User mode. It took about 15 minutes in version 1.0.6 to create a database with related Customer and Invoice files and reports — all without a single line of programming. Everything is done with window and menu choices.

Custom applications require the use of *procedures*, routines built with 4th Dimension's programming language. Layouts for reports, input, or display screens are most easily created by using one of the eight templates (see Figure 5) and then modifying to suit your needs. All copies of 4th Dimension are multiuser without additional cost. You do, however, need a copy for each workstation.

The biggest problem with 4th Dimension has been slow performance, as evidenced in our test results. This capsule review is based on version 1.0.6 of 4th Dimension. Version 2.0, due at the end of this year, promises dramatic enhance-

ments. Version 2.0 increases speed anywhere from 5 to 40 times, according to ACIUS. It also has some 120 new features that take care of many of the complaints about version 1.0.6.

To begin with, the User mode's intuitive interface has been enhanced. Prior to version 2.0, there were separate layout screens for input and display, the latter called an *output layout*. To modify data in a record, you would double-click on the record on the output layout, and the input layout would appear. Version 2.0 enables you to enter data directly on the output layout, as in a spreadsheet.

Reports in 4th Dimension can be done in two ways. You can design an output layout, or you can use Quick Report in the Report pull-down menu. Quick Report, previously a bare-bones report generator, has been enhanced with a scrollable list of fields. You can now change column width, fonts, and size, as you could with an output layout, and headers and footers can be added to each page. Basic math functions have also been added to find the sum, minimum, maximum, average, or count of selected entries in a field.

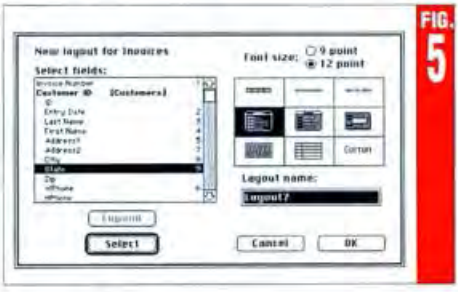


FIG. 5

In the Design mode, the Layout Editor has adopted many of the features of programs like PageMaker and MacDraw. You can specify the position of objects by pixel number. There is now full control of line width and point size.

A new Password Editor enables you to assign group access privileges, as with AppleShare.

With the promised speed enhancements, 4th Dimension could be viable for very large databases, those with 50,000 records. Version 1.0.6 was not. With or without the performance upgrade, 4th Dimension is highly recommended for both the nonprogrammer and the experienced database developer. 4th Dimension lists for $695. ■

Omnis 3 plus

Omnis is an effective visual database. The documentation includes a spiral-bound Reference Manual, a Tutorial Manual, and a Pocket Reference Guide, as well as a disk version of the tutorial. The tutorial is relatively easy to follow if you have some knowledge of databases, otherwise it can be frustratingly difficult. We estimate that a good 100 or more hours of study would be required to learn how to use all the program's capabilities.

Express, the Omnis companion program, helps automate the creation of databases. You are guided through building file formats, and then Express automatically generates the data-entry layouts, report formats, and custom-menu formats. Of course, they're pretty bland formats, but you can begin to use your database relatively quickly this way. Once you've learned more about programming with Omnis, you can modify your application.

Creating data-entry screens in Omnis 3 plus is relatively easy. Headline labels are typed on-screen where your cursor is placed. Clicking on the Field button produces a list of the fields for all the files, and when one is selected it will be placed on-screen where your cursor was. Field attributes include justification, display only, and uppercase only. You're limited in text styles to the Macintosh screen fonts, with bold as your only format option for headline labels. Drawing rectangles around your data is the only other option for dressing up your entry screens.

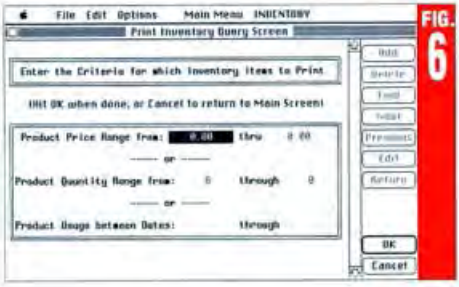


FIG. 6

File formats created in Express are easily amended. You can add to, reindex, or change the data type of your fields. Relations between files are set by checking a Set Connections box. One file then becomes the parent to the other. Multiple connections can be set. Options exist for undoing changes.

Printing a report to a LaserWriter is



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Foster City, CA 94404
(415) 571-0222

difficult to set up. Even if you choose a LaserWriter font on-screen, the report remains in Monaco. Reports are created similarly to entry-form layouts with the addition of detail headings.

Programming in Omnis is done in sequences. Here you are given radio buttons to choose how to initiate commands. The command language takes some time to learn.

Omnis provides password protection for forms and reports and has flexible date and time formatting. Menus are easy to create. Omnis does not support graphic data.

The newest version of Omnis (3.3) due to be released soon provides for increases in some of the file-structure limits. The new release will support the CL/1 connectivity language as well as access to external routines written in other languages like Pascal or C. The reports to screen are WYSIWYG, which should take care of printing with the LaserWriter. Omnis 3.3 will be sold standard as a multiuser program for up to three users. The current version costs $575. The new version will retail for $795, and at its release the price of version 3.25 is scheduled to drop to $249. ■

Reflex Plus

For a beginning database administrator who wants something easy to learn, Reflex Plus is the answer. You can create simple relational databases using this program, which comes complete with a tutorial, a reference manual, and an on-screen help system to guide you in developing your first database. The manual provides modeling tips on how to design your database and many useful examples. If you're someone who skips tutorials, you can create files and define the field types intuitively. A well-outlined reference manual has tabbed references that answer nearly every question.



Borland International
1800 Green Hills Road
Scotts Valley, CA 95066
(408) 438-8400

The program automatically creates screens for immediate data entry, or you can design your own (see Figure 7). The menu available with the entry screens comes with searching features like First, Next, and Delete, which help you find your way through your newly created records. Relations between files are set by visually linking the files through a field created expressly for this purpose. Reflex Plus has Repeating Collections that allow you to include information from related files on entry forms or reports. Reports have been predesigned to appear in list form, but you can define your own if you prefer.

Complex information is processed by preparing a formula whose expressions link the information in related files. It can be difficult to construct the correct formula for a complex, multifile report.

Error messages state explicitly what you've done wrong or what you need to do to continue a procedure. If there's an error in a formula, or if you're changing the database structure and need to close other windows first, Reflex will let you know. On-screen indicators inform you if you've made structural changes to files that you haven't yet saved. If you change your mind, a Revert command allows you to return to your last saved form. Technical support was also quite helpful and friendly about talking us through any unfamiliar terrain.

Working with MultiFinder is no problem, and because Reflex requires only 350K of memory, it's a good choice to run along with your word processors and spreadsheets. An appendix in the Reference Manual explains how to import and export material from popular spreadsheet and database programs for both the Macintosh and IBM computers.

Reflex Plus is limited in that it is not multiuser, is not programmable, and has no security protection. If these features aren't essential for your needs and you want an easy-to-learn database product that will handle your transactions, Reflex has been on the market for quite some time and is reasonably priced at $279. It's the only database we looked at that's small enough to run on a Macintosh 512 with two floppy-disk drives. ■

FIG. 7



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Relational Databases (in alphabetical order)

	 dBASE Mac 1.01	 Double Helix II r49	 1stTEAM 4.0
Price	$495	$595	$795
File structure limits			
Number of fields per record	32,001	unlimited	255
Fields per database	992,031	unlimited	510 billion
Record size (bytes)	32,001	unlimited	65,025
Records per data file	unlimited	unlimited	32,767
Data files per database	31	unlimited	unlimited
Data types			
Character (how many allowed)	255	32K	255
Memo		yes	
Date	yes	yes	programmable
Time	yes	yes	programmable
Boolean		yes	yes
Pictures	yes	yes	
Fixed-point decimal			
Integer			
Floating point	yes	yes	yes
Field attributes			
Unique fields	yes	yes	programmable
Range testing	yes	yes	programmable
Default values	yes	yes	programmable
Lookup to external data tables	programmable	yes	
Must fill field	yes	yes	
Forced uppercase	programmable	yes	programmable
Date conversions	yes	yes	programmable
Automatic incrementing fields	yes	yes	programmable
Calculated fields on entry screen	yes	yes	programmable
Data import/export			
Delimited ASCII	yes	yes	yes
DIF		yes	w/ 1stPORT
DBF	yes		
SYLK		yes	w/ 1stPORT
PICT	yes	yes	
Data manipulation			
Number of indexing fields	1	unlimited	None
Can respecify indexed field(s)	yes	yes	N/A
Can respecify file definition	yes	yes	yes
Multiple record deletions	yes	yes	yes
Multiple record updates	yes	yes	yes
Maximum number of open files	31	unlimited	1
Sorting			
Permanent	yes		yes
Temporary	yes		yes
Multiple fields	yes		yes

	FoxBASE+/Mac 1.0	4th Dimension 1.0.6	Omnis 3 plus 3.25	Reflex Plus 1.01
	$395	$695	$575	$279
	128	511	120	254
	unlimited	511 x 99 plus subfields	2,880	254
	4,000	4 gigabytes	9,480	4,080
	10,737,441,823	16 million	unlimited to 160 Mb	unknown
	unlimited	99	24	200
	254	80	79	4K
	yes	yes		
	yes	yes	yes	yes
		yes	yes	yes
	yes	yes	yes	yes
	yes	yes		
		yes		
		yes		yes
	yes	yes	yes	yes
	yes	yes	yes	yes
	yes	yes	yes	yes
	yes	yes	yes	yes
	yes	yes	yes	yes
	yes	programmable	yes	
	yes	programmable	yes	
	yes	programmable	yes	yes
	yes	programmable	yes	yes
	yes	yes	yes	yes
		yes	yes	
		yes	yes	
	yes			
	unlimited	32,000	12 per file format	254
	yes	yes	yes	yes
	yes	yes	yes	yes
	yes	yes	programmable	yes
	yes	yes	programmable	yes
	48	99	12	unlimited
	yes		yes	
		yes	yes	yes
	yes	yes	yes	yes

Relational Databases, continued

	dBASE Mac 1.01	Double Helix II r49	1stTEAM 4.0
Input facilities			
Prompt messages for fields	yes	yes	yes
Number of screens per file	16	unlimited	1
Number of files per screen	31	unlimited	1
Screen definition:			yes
"Painting"	yes	yes	
Customize color screen	yes	yes	
Coordinate specification	dialogs only	yes	yes
Output facilities			
Date arithmetic	yes	yes	yes
Arithmetic functions (+, - ,* , /)	yes	yes	yes
Exponential functions	yes	yes	yes
Trigonometric functions	yes	yes	yes
Financial functions	yes	yes	
Totals and subtotals	yes	yes	yes
Average	yes	yes	yes
Count	yes	yes	yes
Maximum/minimum	yes	yes	yes
Standard deviation	yes		
Variance	yes		
Report definition method:			
"Painting"	yes	yes	
Automatic	yes	yes	
Predefined mailing labels	yes		yes
Programming	yes		
Headers	yes	yes	
Footers	yes	yes	
Report to screen		yes	yes
Report to disk file	yes	yes	yes
Query facilities			
Search parameters:			
First occurrence	yes	yes	yes
All occurrences	yes	yes	yes
Multiple fields	yes	yes	yes
Case-sensitive	yes	both	yes
Whole word	yes		yes
Value or character range	yes	yes	yes
Boolean And, Or, Not	yes	yes	yes
Special features			
Programmable	yes		macros
Application generator			yes
Multiuser		optional ($990 four-user)	included
Password protection:			
field		yes	
record		yes	yes
database	yes	yes	yes
High-level language interface	yes		
Minimum hardware required	Plus	Plus	Plus
Earliest System version	4.1	4.1	3.2
MultiFinder		yes	yes

FoxBASE+/Mac 1.0	4th Dimension 1.0.6	Omnis 3 plus 3.25	Reflex Plus 1.01
yes	yes	yes	
unlimited	32,000	unlimited	unlimited
10	99	12	unlimited
with version 1.1	yes	yes	
yes	yes	yes	
yes			
yes	yes	yes	yes
yes	yes	yes	yes
yes	yes	yes	yes
	yes	yes	yes
	yes		yes
yes	yes	yes	yes
yes	yes		yes
yes	yes	yes	yes
yes	yes		yes
	yes		yes
	yes		
with version 1.1	yes	yes	
yes	yes	yes	yes
yes	yes		
yes	yes	yes	
yes	yes	yes	yes
	yes	yes	yes
yes	yes	yes	yes
yes		yes	
yes	yes	yes	yes
yes	yes	yes	yes
yes	yes	yes	yes
both	both	yes	
yes	yes	yes	yes
yes	yes	yes	yes
yes	yes	yes	yes
yes	yes	yes	
with version 1.1		yes	
	need one copy per user	optional ($990 five-user)	
	yes	yes	
		yes	
	yes	yes	
	yes		
Plus	Plus	512E	512E
4.1	4.2	4.1	4.1
yes	yes	yes	yes

Speed Tests

SE Results

Test hr:min:sec	dBASE Mac 1.01	Double Helix II r49	1stTEAM 4.0	FoxBASE+/Mac 1.0
Data/import				
500 records	11:03	04:03	01:55	00:07
5,000 records	3:06:00	1:22:22	18:40	01:03
Sorting				
500 records	01:11	not applicable	00:42	00:05
5,000 records	11:35	not applicable	07:42	00:34
Reindexing				
500 records	01:47	01:38	not applicable	00:04
5,000 records	21:20	25:07	not applicable	00:21
Search one record				
500 records	00:03	00:01	00:03	less than 1 sec
5,000 records	00:04	00:01	00:28	00:01
Search multiple records				
500 records	00:30	00:08	00:06	00:04
5,000 records	01:16	00:17	00:10	00:10
Reports				
500 records	00:04	00:06	00:05	00:02
5,000 records	00:04	00:29	00:18	00:03
Deleting (whole record)				
500 records	28:30	02:32	00:29	00:03
5,000 records	07:36:00	42:00	04:12	00:25
Global change				
500 records	01:45	01:09	00:08	00:01
5,000 records	04:43	03:29	00:13	00:02

Mac II Results

Data/import				
500 records	03:10	01:19	00:52	00:03
5,000 records	1:02:31	19:07	08:10	00:30
50,000 records	*	4:15:00	**	3:31
Sorting				
500 records	00:35	not applicable	00:19	00:03
5,000 records	05:15	not applicable	04:01	00:13
50,000 records	*	not applicable	**	4:28
Reindexing				
500 records	00:31	00:29	won't index	00:02
5,000 records	09:39	08:39	won't index	00:08
Search one record				
500 records	00:01	less than 1 sec	00:01	less than 1 sec
5,000 records	00:01	00:01	00:19	less than 1 sec
50,000 records	*	00:02	**	00:02
Search multiple records				
500 records	00:09	00:01	00:03	00:02
5,000 records	00:18	00:04	00:04	00:05
Reports				
500 records	00:01	00:01	00:08	less than 1 sec
5,000 records	00:02	00:15	00:22	00:02
Deleting (whole record)				
500 records	07:58	00:51	00:17	00:02
5,000 records	3:01:23	12:57	02:28	00:09
Global change				
500 records	00:36	00:29	00:04	less than 1 sec
5,000 records	01:36	01:24	00:07	00:01

4th Dimension 1.0.6	Omnis 3 plus 3.25	Reflex Plus 1.01
11:17	04:10	00:42
1:54:50	48:33	06:37
00:39	00:12	00:13
16:49	01:55	02:47
01:12	00:31	00:52
18:41	10:05	07:31
00:05	00:01	00:03
00:08	00:01	00:20
00:11	00:02	00:03
01:14	00:03	00:08
00:15	00:03	00:16
00:28	00:03	01:50
02:32	00:53	00:18
33:45	11:06	02:58
03:07	00:10	00:14
06:27	00:29	00:43
06:38	02:17	00:15
55:43	21:33	02:42
24:00:00	3:26:00	42:12
00:12	00:08	00:05
04:05	01:20	00:54
05:09	11:05	***
00:40	00:20	00:22
08:41	06:27	02:58
00:02	00:01	00:01
00:03	00:01	00:05
00:04	00:01	***
00:04	00:02	00:02
00:22	00:02	00:03
00:06	00:02	00:04
00:11	00:02	00:50
02:20	00:34	00:06
17:09	06:19	00:57
00:55	00:04	00:07
03:10	00:12	00:22

* Stopped test after 24 hours — 22,624 records.
** Supports only 32K records.
*** Crashed in test.

KUDOS

MacUser Labs would like to thank the following people for their assistance with this project:

Alexis Rosen, consultant.

Eric Erickson, reviewer.

Jeff Pittelkau, testing technician.

Tony Root, reviewer.

Susan Schuelke, database project leader, reviewer.

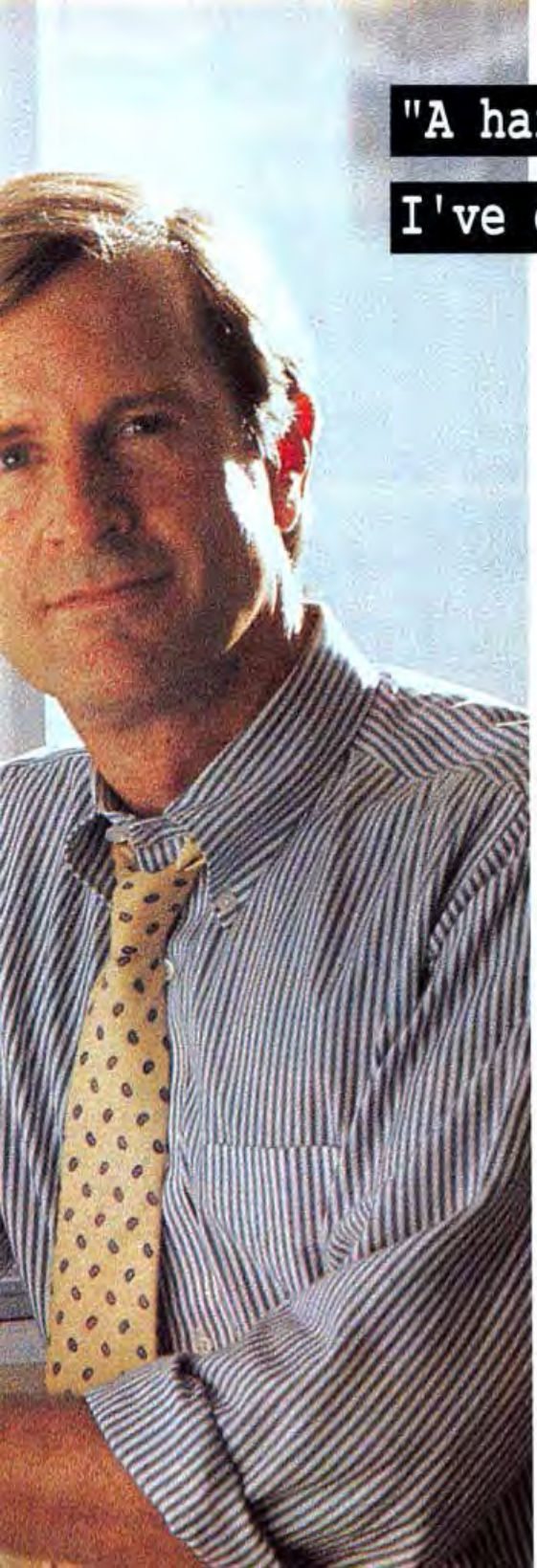
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Diane Wilde, technical writer/editor.

Jasmine Technologies, Inc., for use of 100-Mb Direct Drives.

CMS Enhancements, Inc., for use of PRO 45 hard disk.





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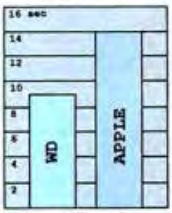
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MEDICINE
Sahlgren University Hospital–Sweden

"Without any earlier experience with programming, we were writing our own applications after the LabVIEW 3-day training course." Dr. Anders Ullman uses LabVIEW in clinical pharmacology. Muscle contractions evoked by nerve stimulation or by different drugs are measured via isometric force transducers with a plug-in analog input board. Each channel is monitored on a LabVIEW strip chart.





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"We initially set up our system on a MicroVAX. It took 6 months. With LabVIEW and a Macintosh II, we got it working in a couple of weeks." Azucena Overman, graduate student in the Physics Department, researches the chemical properties of surfaces. In her research, LabVIEW controls GPIB instruments and graphs the data collected.

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THE HELP FOLDER

BY CHRIS ESPINOSA

Got a Mac problem? Something you'd like explained? Something you can't find the answer for anywhere else? Apple's Chris Espinosa will answer your questions every month in this space. When the questions are too tough or too esoteric for him, he'll get the answers from other members of the Mac team. So ask what you need to know and get your answers straight from the source!

Send your questions to Chris care of MacUser, *950 Tower Lane, 18th floor, Foster City, CA 94404. Chris will read all your questions, but, unfortunately, he may not be able to answer individual queries.*

CHUNKY TEXT IN HYPERCARD FIELDS

Q. I read with interest *MacUser*'s July '88 Tip Sheet tip on font substitution with HyperCard and the LaserWriter Plus. I have been experiencing the same problem when using my weekly schedule stack.

As you can see in the enclosed samples, I get the desired PostScript fonts on all Fridays, but not any other day of the week. The screen image shows all daily text fields to be the same font, and a check of the text field parameters indicates that all text fields are equivalent. I have copied the parameters of the Friday field into each of the other daily fields with no result. Overlapping one field or button onto another does not seem to make a difference. Can you explain this anomaly?

JEFF MORRIS
FOUNTAIN VALLEY, CA

A. Early versions (through version 1.1) had some problems with getting Print Card to print LaserWriter text in fields. Version 1.2 clears up many of the problems, but there's one rule to follow: Nothing should overlap the field being printed. The most common culprit is not other buttons or fields; it's the card picture.

If you're having trouble getting text fields to print out in LaserWriter fonts, make sure there are no opaque Card Picture bits over the field. To eliminate them, choose the rectangular selection tool, select an area bigger than the field, and choose Transparent from the Option menu. That should help the LaserWriter fonts come out in full 300 dot-per-inch glory.

BACKING UP APPLESHARE

Q. We are managing a small AppleTalk network with about six Macintosh Pluses, all of them sharing an 80-megabyte Apple hard-disk drive controlled by AppleShare running on a Plus.

Everything works nicely, but there is one problem with data protection. We routinely back up the Server disk using an Apple Tape Backup 40SC — just the modified files each day, and a total copy each week. Just to be prepared in case of a disk failure, we set up an Apple 20SC hard disk as a backup. In case of a disk problem, we would like to be able to quickly restart AppleShare on the 20SC, possibly with just part of the data (the most recent or important). However, we are facing the problem that AppleShare seems to forget folder-protection attributes when the folders are copied to another disk.

A possible solution is to make a Backup Volume and then, in case of failure, to make a Restore Volume on another device. This, I assume, should preserve each folder's access privileges. However, this would require keeping another 80SC idle, just waiting. It would be much more convenient, and cheaper, to have a less expensive 20SC as an emergency backup.

Is there a way around this problem?

VINCENZO GUARDABASSO
S. MARIA IMBARO, ITALY

A. The problem is that AppleShare keeps track of access privileges by using the directory IDs of separate folders. But when you back up a hard disk and then restore it, all of the directory ID numbers are set differently. So AppleShare can't match up its stored lists of access privileges with what is on the disk. The way around this is to make an image backup, usually on a tape. This makes a "clone" of the hard disk on a tape, keeping all directory IDs intact and correctly restoring them later. The problem is that the Apple Tape Backup 40SC software will restore an image backup only to a hard disk that is exactly the same size as the original, so you can't restore the 80-megabyte backup image to the 20-megabyte "safety" disk.

Another alternative is a program from SuperMac Software called Network DiskFit. It's the networked version of their DiskFit floppy-disk backup software. It lets you back up an AppleShare file server volume incrementally, and it keeps track of your folders' access privileges when you restore.

PROBLEMS READING FLOPPY DISKS

Q. I've recently purchased an Ehman Engineering 800K

external drive for use with my Mac Plus and have noticed that, if a disk is initialized in the external drive or if anything is written to a disk in the external drive (even something as simple as an update to the desktop), the internal drive will not recognize the disk as a Macintosh disk and I get the dialog box asking whether I want to initialize the disk. (I click Cancel, of course, because the disk still reads perfectly on the external drive). Am I experiencing a problem with the head alignment in the internal drive, or is the problem more likely to be with the external drive?

COLIN SEOW
BROOKLYN, NY

A. It's likely that the two drives have different head azimuth adjustments (that's the angle at which the recording head meets the magnetic media). But which one is right? If the situation is symmetrical — if the external drive can't read disks written by the internal drive — then it's hard to tell which one is out of alignment. It might be both! A third drive could act as a tiebreaker: The drive that writes disks that a third drive can read is probably the good one. But if your internal drive writes disks that the external drive can read but not vice versa, then it's probably the external drive that's out of adjustment.

Here's why: *Misadjusted azimuth* means that the drive head (the magnetic recording head that touches the disk itself) is just a little off-center, and the magnetic "tracks" it makes might be narrower than usual, or possibly elliptical rather than round. If you read that disk on the same misadjusted drive, it will probably be all right. But a correctly adjusted drive, which expects a wide, circular track, will not be able to get all the information from the narrow, elliptical track.

I'd recommend you get the external drive fixed pronto. Be sure to protect your data first by copying all the files from externally created disks onto disks in your internal drive. By fixing your external drive to make it compatible with your internal, it also won't be able to read the disks you created on it when it was misadjusted!

ROM QUESTIONS THAT REFUSE TO DIE

Q. **FileMaker's customer support told me that FileMaker 4 works on "original" Mac Pluses but not on 512s that have been upgraded to be Pluses. That must mean that there is some difference between the originally installed 128K ROM and the 128K ROM upgrades. Is that right? If so, what is the difference, and are there other applications that work with one but not with the other?**

TREVOR ROBINSON
AMHERST, MA

A. I'm not sure where they're getting their information, but there is no difference among the ROMs in a Mac Plus, a Mac Plus Upgrade Kit, and a Mac 512KE. In fact, the Mac Plus Upgrade Kit for 128s and 512s consists of the identical logic board that's in the Mac Plus itself. So software that runs on one of them (given sufficient memory, of course) can run on either of the others.

LASERWRITER AND IMAGEWRITER TOGETHER

Q. **How do you keep using your ImageWriter printer after you've stepped up to a LaserWriter? We want to buy a laser printer for the Mac network in our law office. It seems we're going to have to go to the trouble of converting all our forms and boilerplate documents over to non-bit-mapped fonts for printing on the LaserWriter.**

Adding insult to injury, we won't be able to continue to use our ImageWriters as backup printers, because the new LaserWriter fonts produce horrible-looking printing on a dot-matrix printer.

Have we missed something? Is there some other way to step up to a networked ink-jet or laser printer without having to convert the bit-mapped fonts on our forms? If not, how do we use our ImageWriters?

ED SIMMERS
BELLINGHAM, WA

A. There are a couple of things you can do, depending on what it is you like so much about laser printing.

The LaserWriter drivers have a Font Substitution feature that automatically substitutes laser-quality fonts for bit-mapped ones — Helvetica for Geneva, Times for New York, Courier for Monaco. If you're using those three Mac fonts, then you can just check the Font Substitution checkbox in the Print . . . dialog box and get Laser fonts on your printouts automatically. But since the laser-printed characters tend to be smaller than their bit-mapped peers, Font Substitution adds extra space to retain the page breaks and line layouts. You'll see uneven spaces at the end of lines and extra space around boldface words. That's Tradeoff No. 1: It requires no work, you get good dot matrix, and the laser printing is OK but not great.

Or you can convert your documents to Helvetica, Times, or any other LaserWriter font. Your laser-printed documents will look much better. If you make sure to use Font/DA Mover to add all the appropriate screen fonts to your System file, the ImageWriter output at the Best setting will be pretty good. So that's Tradeoff No. 2: It requires a little work, and you get decent dot matrix and good laser printing.

If you're getting a LaserWriter because it's fast, quiet, and shared, but you'll still use the ImageWriter, I recommend Tradeoff No. 1. But if you're buying the LaserWriter because of the superior documents it can create, I'd go for Tradeoff No. 2.

GHOSTS IN THE MACHINE

Q. **I have a LaserWriter IINT which I use with my Mac Plus and Mac II. I have come across a disturbing double printing of certain parts of the laser printouts. This condition appears to occur only when you have a black picture that is vertically longer than two inches. A duplicate second image is layered two inches below, causing another black layer**

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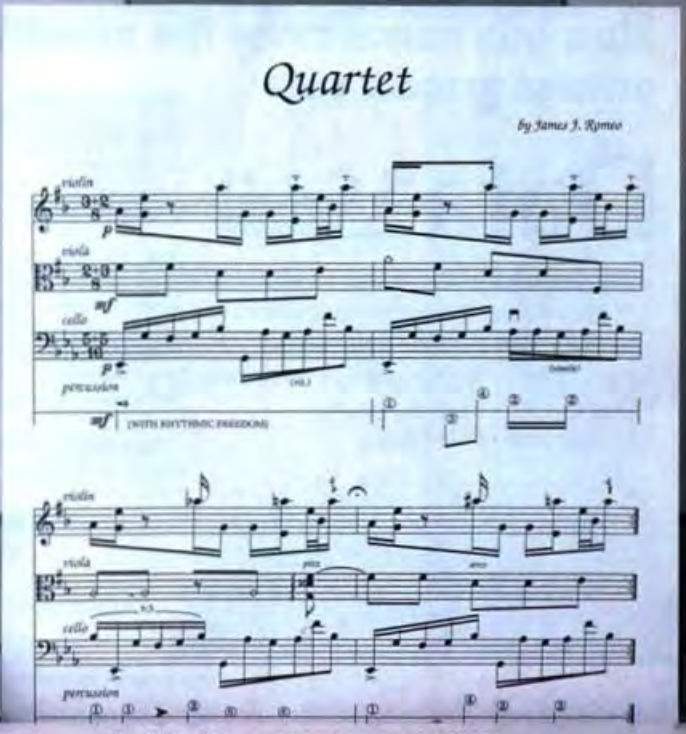
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to be put over the first image, which results in the image being blacker at the bottom. The condition is more pronounced when the Contrast setting is not the darkest black. Is this a defect in the Apple LaserWriter II?
RALPH NARUSAKI
HONOLULU, HI

A. To get blacker blacks on the LaserWriter II, the design of the cartridge was changed to attract more toner powder to the imaging drum. Sometimes not all the powder gets applied to the paper or scraped off by a cleaner blade, so there's some residue left on the cylinder. Because the cylinder is only two inches in circumference, sometimes this residue creates a faint "ghost" image lower down on the page.

It only happens on documents with large areas of solid black and solid white; most text, line drawings, or scanned-image documents won't show the faint ghosting. But if you notice ghosting, there are some ways you can avoid it. Turn the Print Density dial (inside the printer, on the right) to a lower number. Or print one entirely black page before your problem page — this will coat the drum evenly and reduce ghosting. Or just print several copies of the problem image. The ghosting phenomenon is irregular, and it's likely that one of your copies will be OK.

WORKS PLUS SPELLS MINUS RAM

Q. **When I used the initial version of Works Plus Spell (before upgrading), I was using it with just the internal drive of my 512KE. It worked perfectly in all respects. I recently purchased a 20-megabyte hard-disk drive, which I am now using. Since I received the upgrade and installed it following the instructions for use with a hard-disk drive, I have never been able to get the program to work.**

I've installed it several different ways but when I call up the program to check a document, I get a dialog box informing me that there is not enough memory to load the dictionary and I should try closing other documents to create more space. The only document I have open is the letter I'm trying to work with. I'm puzzled.
JERRY BLAIR
WALNUT CREEK, CA

A. In the relatively cramped world of the 512KE, you have to be careful about "going over the edge" of the memory you have. The hard-disk drive is a little more complicated to run than the floppy-disk drive,

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and the software that makes the floppy work is in the Macintosh ROM; it takes up no RAM. But the (slightly larger) code to make the hard disk work isn't in ROM; it's loaded off the hard-disk drive into RAM each time you start up. That means that you have a little less memory space free on a hard-disk system than on a floppy-disk system. That's probably what's making the difference.

Another possibility is that the startup information on the hard-disk drive (the "boot blocks") set aside more memory for the system's use than the floppy does. Try booting off your old floppy (with your hard-disk drive attached) and running Works Plus Spell from the floppy. It's awkward, but I probably don't need to tell you the real solution: Buy more memory.

WINDOWS TOO WIDE

Q. I have a different Command-Shift-4 problem than Vanya Matzek (August '88 Help Folder) with a Macintosh SE and a 1984 ImageWriter. The printer begins at the left-hand register mark when printing a screen dump (Caps Lock Command-Shift-4), but when printing a window dump it leaves a 1-inch margin. Since a full-size window is more than 7 inches wide, the print head reaches the end of each pass with the current "slice" unfinished, and then prints the remainder at the left-hand mark at the beginning of the next pass.

I can, of course, often avoid this problem simply by narrowing the window an eighth of an inch — but only when there's enough unused space at the right. Is there any way of reducing or removing the 1-inch printing margin? And will this affect preset margins or Page Setup parameters?

PETER W. M. BLAYNEY
SILVER SPRING, MD

A. Guess what? That's a bug. If a window is wider than 7 ⅜ inches, it'll wrap around when you print it with Caps Lock Command-Shift-4.

There's not much to be done about that, because the code that does the printer dumps is pretty firmly wired into the ROMs of the Mac Plus, Mac SE, and Mac II. It doesn't use the ImageWriter driver at all, ignores Page Setup, won't respond to the Chooser, can't be used with a spooler, and can't be changed very easily. It's pretty uncooperative.

You're right about the cure: Don't do that. Or you could use Command-Shift-3 to save a screen dump, then edit in MacPaint or HyperCard to get just the

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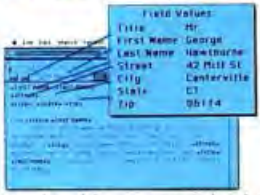
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THE HELP FOLDER

window, then print it out normally.

THE LAST OF THE IMAGEWRITER HEX-DUMP QUESTIONS

Q. In the September '88 Help Folder, you answered a question regarding the ImageWriter II's annoying hex-dump problem. It is easy to blame the problem on human error, but I believe the problem is in the printer design.

When the ImageWriter II is powered on, it performs a reset. Often when the power is cycled off and on (say, to clear print settings), the printer will not perform a full reset. Anything printed then will come out in hex.

Often Mac software will cause a full reset before printing, but in those cases where it does not, this problem will occur. I have been watching this problem since I bought my printer two years ago and this is the most logical conclusion I can draw.

DOUGLAS E. WELCH
LOS ANGELES, CA

A. After asking a few more people and experimenting a little on an ImageWriter II, I believe that hex dumps happen for two reasons. One, your fingers may be bumping the Select switch when you turn on the power (which is the cheap answer, I admit). Two, power-cycling the Macintosh while the printer is left on sometimes "half-resets" the printer, as you mention. Both of these cases cause the next print job to be printed in hexadecimal numbers rather than in text and graphics. So remember to turn your printer on *after* you've turned on the Mac, and keep your big thumbs away from the Select button when doing so.

HYPERCARD'S MAX OF 64

Q. I have discovered that HyperCard's Max, Min, and Average functions appear to be limited to evaluating lists containing a maximum of 63 items. This discovery alone is surprising, since it severely limits the usefulness of these functions. More bothersome, however, is the fact that violating this limitation frequently (but not always!) causes HyperCard to crash with the message "Unexpected error 6019301" displayed following the "Expression too complicated" alert. This occurs on a Macintosh SE using HyperCard 1.2 and System 4.1. Is this a real limitation of HyperTalk or is there a way around it?

JOHN BARO
ST. LOUIS, MO

A. There is, in fact, a 64-element limit (not 63). In either

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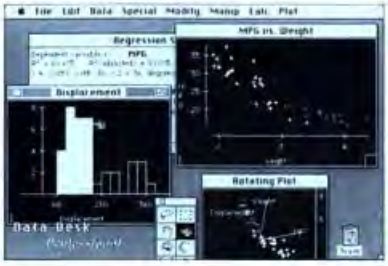
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case, this is a real limitation in versions 1.2 and earlier of HyperCard, and it's not just restricted to the functions you mentioned.

HyperCard keeps an internal Expression Evaluation stack during calculations. This stack can contain 64 elements at a time. For example, if you try to evaluate 2*(3+4+5), the high-water mark will be three elements: it'll push the *2*, to be dealt with after the parentheses are evaluated; it'll push *3*, then *4* (for three elements on the stack), add them, push *5*, add it, then multiply that by the *2* already there. When you use a function, each parameter of the function takes one stack slot, so the function max (the List) takes one more stack slot than the number of items in the list.

You have to break calculations up in order to get around this limitation. With Min and Max, it's easy: take the Min of the first 50 items, then the Min of the second 50 items, and so on, and then the Min of those. Same for Max. But for Average, you can't do it that way; you must manually add up the items (in a repeat loop), then divide by the total number of items to get the correct average.

I don't know why it's crashing. It shouldn't do that.

. . . AND SOUNDS

Q. I have created several stacks with MacRecorder, with seven to ten sounds each. When I use them on my Mac 512KE (upgraded with a Dove 548S to 2 megabytes), execution will eventually hang up. I have tested these stacks on a plain Mac Plus and Mac SE and there is no problem on these systems. The problem does not seem to be related to the hard-disk drive, either, because the stacks work fine when the MacBottom 45S is connected to a Mac Plus. I have removed all INITs, installed System 6.0, checked for viruses, and tested the stacks on HyperCard 1.2 hoping for a fix, but the problem persists.

No other application seems to be affected by this problem, though I'm not sure what applications I have that would use the additional memory except possibly SuperPaint and Microsoft Word. It appears to be some addressing or recovery problem between HyperCard and the Dove upgrade. Can you provide me with any suggestions?

JAMES SCHEIB
IOWA CITY, IA

A. That was a bug in the Sound Manager of System 6.0. It has been fixed in System 6.0.1.

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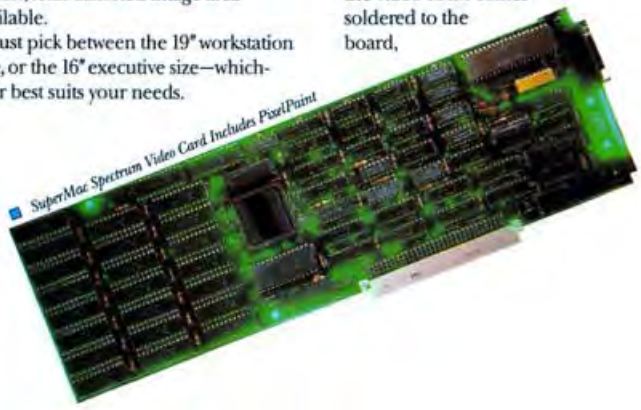
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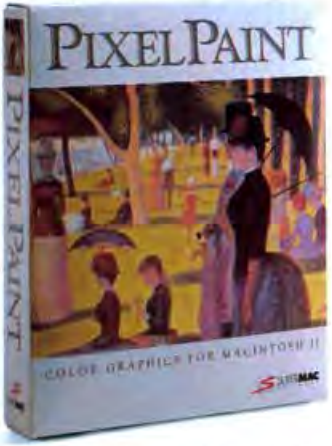
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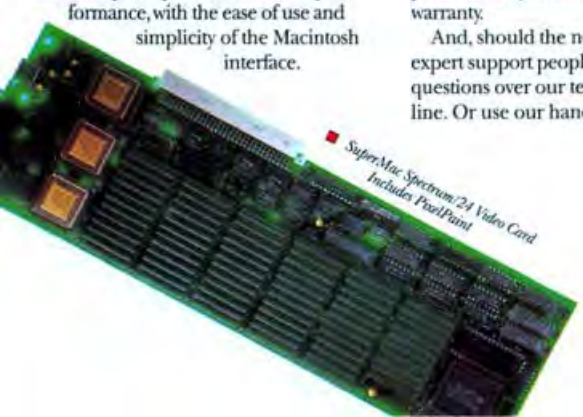


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Once, drafting maps required considerable artistic and technical expertise. Now, however, maps of respectable sophistication can be produced on your Mac in a matter of hours with MapMaker 3.0 and GeoQuery. Desktop Mapping — as Apple calls it — is here.

DESKTOP MAPPING

Though both programs use geography as their frame of reference, the similarities end there. MapMaker 3.0, with its extensive collection of boundary files (three sets: the world divided into nine regions, the U.S. by states, and the states by counties), creates maps to your specifications. On the other hand, the maps produced by GeoQuery are more medium than message. Their purpose (as the program's name suggests) is to provide a mechanism to probe database files on geographical criteria. In MapMaker, the program automatically graphs data variables assigned to the mapped areas, producing a geographic picture of the data values. In GeoQuery, database records with zip code information (GeoQuery's organizational linchpin) are automatically plotted as "Push-pins" on a map from which geographic relationships can be discerned and individual records accessed.

DIGITAL CARTOGRAPHY

MapMaker boundaries (numerical descriptions of the geography) can be combined, divided or used in their entirety. For example, countries from the European, African, and Middle Eastern boundary files can be joined into a custom map of the Mediterranean Basin. Large scale maps of American locations (even areas like New York City) can be produced in reasonable detail by assembling the appropriate county boundaries from each state.

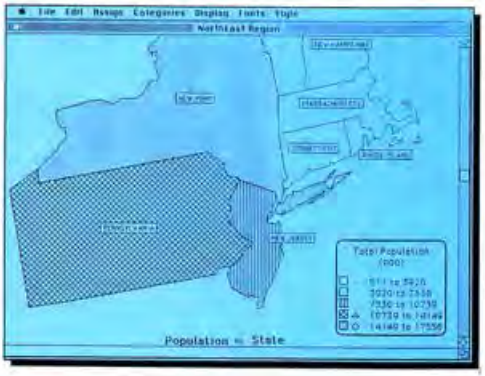
MapMaker comes with boundaries for the U.S. by state, all 50 states by county, 90 U.S. metropolitan area centers, the world (nine regions) by country (176), and 169 world capitals.

BY CARLOS DOMINGO MARTINEZ

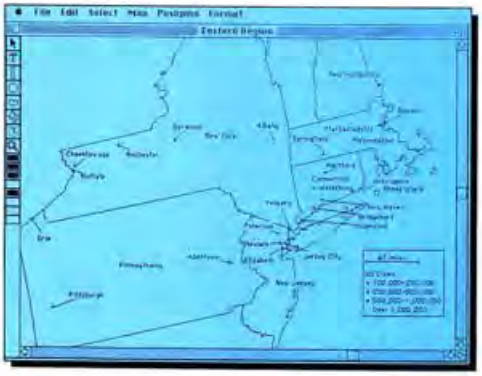
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GeoQuery, though it lacks the extensive map-generation capabilities of MapMaker, can produce some nice-looking maps as well. On launch, GeoQuery builds a map of the continental United States, the only area (along with Alaska and Hawaii) that it can map. Deleting areas and rescaling the plot yields "Regional" maps. This method is adequate but, at larger scales (fewer miles to the inch), GeoQuery maps begin losing detail.

GeoQuery comes with atlases for the U.S., Alaska, and Hawaii, and a data file of cities with more than 50,000 inhabitants.



MapMaker maps can display data, like these population statistics, in a variety of graphs.



GeoQuery can plot records, like these American cities with 100,000 inhabitants, by zip code.



For a map of the New York Metropolitan area, MapMaker combines your choice of counties from different state files. Fourteen different boundaries were combined here.

SETTLING INTO THE ENVIRONMENT

MapMaker builds a unique map, scaled according to the boundaries selected and the size of the chart (up to 8 x 10 inches), every time. If you decide to add or delete boundaries, or to change the size of the map, it must recalculate the new configuration. Starting over after customizing a map can be painful. However, maps are drawn fairly quickly, so try different combinations before settling on the final design.

After drawing a basic map, GeoQuery lets you change the scale within a specified range. However, scales larger than the limit require the deletion of map elements. If you later wish to restore a region (a state, for example), the program lets you add it from the atlas but only if it fits the page. (GeoQuery maps can be as large as 22 x 22 inches.) If the additions are too large, you must reconstruct the map either in a different scale or on a larger page. Adding regions to completed maps (with data displayed) can take some time, as GeoQuery needs to sort through the data to plot the required Pushpins. With both programs, it pays to finalize a design before proceeding.

A MAP OF ONE'S OWN

Both packages make combining map areas easy. Simply select the areas and designate them as joined entities. However, GeoQuery excels at division. The basic building blocks of GeoQuery maps are Regions, which are the essential geographic elements that make up the map, and Shapes, which are user-defined boundaries created with GeoQuery's drawing tools. To divide regions, you use the Slicer tool to create two shapes, delete the original region, and convert the shapes into new regions. However,

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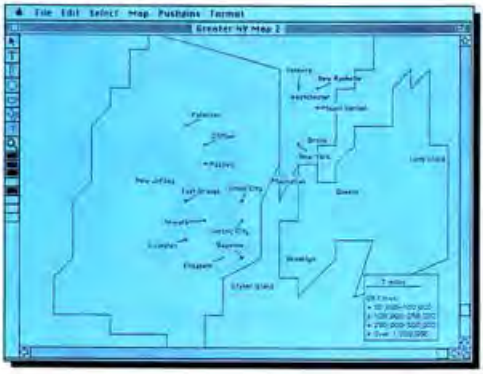
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there is a limit to how small you can slice. Circular regions can be specified by radius from a particular zip code.

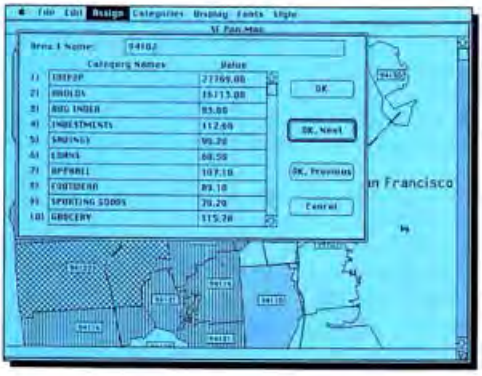
Dividing an individual boundary (say a county) in MapMaker is more difficult. The short-term, direct route is to transfer the map outline (Base Map) to a paint application to draw the new borders. Back in MapMaker, open the original and the modified map (Open MacPaint option), delete the undivided area from the original map, and, with the Trace New Object command, activate the new areas. MapMaker's ability to assign new map areas means that virtually any imported graphic can become a map or part of a map.

The long-term permanent route is to modify the boundary-file itself. MapMaker can convert unprotected and accessible boundaries into text format. Using the supplied text editor, the boundaries can be altered to suit. The principles of boundary file creation and modification can be found in the manual. But no matter how clear the documentation, you should always work with backups. As well as creating new boundary divisions, you can add permanent reference locations (like roads, rivers or company warehouses) to boundaries in this fashion.

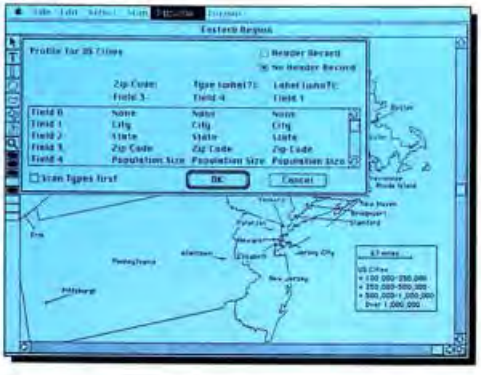
The process of converting to text and back can also be used to change the "projection" of boundary files. Actual longitude and latitude, Albers Conic, Miller Cylindrical, and standard Mercator are the available projection choices, and each can be modified.



GeoQuery's map of New York City was made by slicing sections from the New York and New Jersey map regions. These are the same boundaries (rescaled) that the program used for the original U.S. map.



MapMaker assigns each map area a value for each data category. Choosing categories automatically graphs the relative values for each area.



GeoQuery imports data to be plotted on the map. Files must incorporate a zip code for GeoQuery to process them. The Profile Dialog also lets you designate a sort criterion (Type) and a Pushpin name (Label).

MAP DRESSING

Once you've got what you want, MapMaker makes it easy to dress up your map. Map areas can be offset with the Explode option. Patterns and colors (visible on a Mac II) can be assigned to all map features, including the 35 available symbols. Double-clicking on the map (or on existing text) lets you add (or edit) labels on the spot. A global text-change option is also available.

GeoQuery maps can also be dressed up, but there are fewer options in its closet. The thickness and pattern of the borders of regions and shapes can be specified, the symbols depicting Landmarks or Pushpins can be changed (20 choices), and text attributes can be altered. On Mac IIs, GeoQuery displays a color palette in the toolbox. Assigned colors will be visible on Mac II screens. However, unlike MapMaker, GeoQuery cannot assign colors to maps produced on a Mac Plus or SE.

GEOGRAPHICAL QUERIES

The records that GeoQuery charts

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must be imported as tab-delimited text files. Keyboard entry is not supported, and the records must incorporate a zip code field. GeoQuery can be slow in processing large data files. A 1,000-record file takes about a minute on a Mac II and almost three minutes on a Plus or an SE. The explanation is that GeoQuery first validates zip codes and then matches them to the zips in the map. For this reason, it's a good idea to presort large files and eliminate extraneous records in the original database application.

When loading the file, the program lets you specify one field as Type, which provides a sort criterion, and another field as Label, which is the on-screen Pushpin name. You can ask GeoQuery to scan the Types field first. This sorts the file into categories and lets you choose which to include.

MapMaker's charting data can be entered from the keyboard or imported as a text file. Category names for each data variable are imported separately, and the data values themselves must be in tab-delimited form. MapMaker lets you specify how data values will be divided for graphing. The program can create as many as 35 divisions. These can be calculated in equal intervals or in N-tile groups (the number of areas or data points divided by the number of divisions). Or, if you prefer, data ranges can be entered manually.

Both programs can produce limited statistical breakdowns. MapMaker gives totals for a selected category and its data divisions. GeoQuery reports on the records present in selected areas. For more extensive analysis, DataDesk (also from Odesta) can be used with GeoQuery. And, by the time you read this, Select Micro Systems' Exstatix, a statistics package that links with MapMaker, should be available.

SHOWING OFF YOUR DATA

MapMaker assigns data variables to each map area by category. When a category is selected, MapMaker graphs those values according to the data divisions. Colors and patterns assigned to each data value are displayed in the map legend next to the indicated values. As well as standard pattern graphs, MapMaker can construct Area Cartograms (map elements sized according to the data value) and Dot Density plots. Data assigned to map points (such as cities or company production centers) can be graphed in graduated circles.

The GeoQuery map display is more limited but has some special features. Clicking on a Pushpin with the Snoop-

Mapping in the Fast Lane

This is for those of you who enjoy reading about Maseratis — even though you can't afford one. For most of us (except those with municipal governments or multinational corporations to manage) the MapGrafix Mapping System from ComGrafix (302 South Garden Avenue, Clearwater, FL 34616; (813) 443-6807), falls into the same category as exotic cars. For $8,500 you can buy an integrated system for map generation, geographic analysis, and database management.

Maps are produced and edited in a multilayer, CAD-like environment featuring user-definable scaling and rescaling capabilities, automatic dimensioning and area calculation, and 16-digit floating-point precision. Built-in file translators give MapGrafix the ability to work with a variety of image formats, including digitized photos.

Every element in a MapGrafix map can be linked to the appropriate records in a database. MapGrafix will work with a variety of database systems (including minicomputer- and mainframe-based relational systems) and can access them over direct links or networks. And, of course, there are extensive data reporting and image output options.

The MapGrafix system will run on a Mac Plus, SE, or II (recommended). Requirements include a hard disk (think large), a digitizer, a printer or plotter (or both), and a relational database system. That's in addition to the $8,500. So, we *are* talking a lot of bucks here. But, we're also talking a lot of bang too.

So for $20,000 (a lot less than a *Maserati*) you can get a reasonably complete configuration. A minicomputer-based system of comparable power would likely run you five times as much. And, that mini system won't "look and feel" like a Mac.

A Geographic Database

Remember those early Macintosh ads with the digitized wine cellar? That wine cellar database was created on a product called Filevision, one of the first programs available for the Mac. Its successor, Business Filevision (available from Marvelin, 3420 Ocean Park Blvd., Suite 3020, Santa Monica, CA 90402; (213) 450-6813), is still great for that kind of application. With a good complement of tools, it can draw a picture of your warehouse or file room and let you know at a click where everything is. Micro-geography, I like to call it.

A visual database that can link information to graphics objects lends itself admirably to mapping applications as well. Business Filevision comes with a U.S. map template to start you off but, in most cases, you'll need other maps. Though it doesn't open any other graphics files directly, you can import images through the Clipboard. (You could build your base maps in MapMaker.) The program's drawing window is an object-oriented layered environment. Up to 16 layers (Types) are possible and they can be transparent or opaque and turned on or off, permitting overlays on the same map. A built-in editor lets you create map symbols as necessary.

Every object in every layer can have records attached, information screens can be customized, and files can grow to 4 megabytes. Files in the database can be linked, and conditional queries are supported. Business Filevision can create and print custom reports, forms, and labels. Individual records and map screens can be printed as well.

Business Filevision retails for $395. Add in MapMaker 3.0 ($349) to generate those maps, and for less than $750, you have much (of course, not all) of the power of the $8,500 MapGrafix system. That's a bargain.

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er tool reveals the associated record. Multirecord locations are denoted by a special symbol, so you can see them at a glance. Draw a circle and it can report on every record falling within a given radius. And, the Ruler tool gives the distance between two points in a flash.

FILE MOVING

Both programs let you save data files for reuse or for export to other applications. Images, however, are another story. GeoQuery saves maps only in its own format and only map outlines can be exported through the Clipboard. MapMaker is more versatile. In addition to saving files in its proprietary format, MapMaker can save base maps or completed charts as MacPaint or MacDraw (though not MacDraw II) files, thus facilitating their transfer to other applications.

MapMaker opens MacPaint documents directly, but MacDraw or PICT files must be imported through the Clipboard. GeoQuery cannot open any foreign files because the imported maps would lack the required zip code information.

PUTTING IT ON PAPER

LaserWriter and ImageWriter support is standard on both programs. Colorized MapMaker maps will print in color on the ImageWriter II and LQ. GeoQuery maps will print in color only from Mac IIs. Mac Plus and SE users can print only in black and white — regardless of the color attributes of the maps. Neither program directly supports other output devices. However, MapMaker documents, according to the manual, should be printable on plotters or other devices with the proper drivers.

In addition to maps, both programs permit you to print data reports. MapMaker will produce a report of the category names and data values displayed on the current map. GeoQuery can print individual records and the contents of its short or long (Pushpin labels included) report windows.

CARTOGRAPHIC ANALYSIS

MapMaker 3.0 and GeoQuery are like the proverbial apples and oranges — both are fruits, but they're very different when you cut them open.

MapMaker is a map generator, a graph/chart builder, and a geographic analyst rolled into one. It has the edge in cartographic detail (out of the box, it maps the entire U.S. down to the county level), geographic versatility (maps the world), graphic options (generates a variety of charts), implementation of color (not tied to the Mac II), and file transportability (maps can be moved to other applications). It also deals better with data values. It has more power and features, and it is more suitable for customization.

As a mapping tool, GeoQuery is less flexible than MapMaker. But, for data organization and information access, GeoQuery is stronger. To plot individual records or evaluate and access a database from a geographic perspective, GeoQuery is the better choice. What it does, it does well.

Personally, I like MapMaker better. If I could buy only one, it's the cartographic program I'd get. It simply does more. Both programs, however, will help you gain a sense of where you are. Your choice depends on where you want to go, and what you want to know when you get there.

CARLOS DOMINGO MARTINEZ IS A MACUSER CONTRIBUTING EDITOR. WHEN TRAVELING IN A GROUP, HE ALWAYS USURPS THE ROLE OF NAVIGATOR.

Breaking Boundaries

If your application requires it, more detailed boundaries can be purchased separately for both GeoQuery and MapMaker.

Strategic Locations Planning offers a number of packages for MapMaker. These include boundary files for the U.S. by 3-digit Zip Code ($245), Telephone Area Codes ($99), Congressional Districts ($395), MSA (Metropolitan Statistical Area — 325 nonrural sections of the U.S., $145; $99 per data file), Areas of Dominant Influence (TV markets as defined by Arbitron, $145; $99 per data file), Designated Marketing Area (TV markets as defined by A.C. Nielsen $145), and a more detailed set of county boundaries ($245 or $50 for individual states). Boundaries and data for 5-digit Zip Code, Census Tract, and Minor Civil divisions/Census County Divisions, as well as custom boundaries, are available at higher prices. You can reach Strategic Locations at 4030 Moorepark Avenue, Suite 123, San Jose, CA 95117; (408) 985-7400.

Regional, state, county, Metropolitan Statistical Area, Areas of Dominant Influence, and Designated Marketing Area atlases are also available for use with GeoQuery. Contact Odesta for details and pricing.

MACUSER RATING

MapMaker 3.0 ★★★★½

Follows Mac Interface	■■■■■
Printed Documentation	■■■■□
On-Screen Help	■■■■□
Performance	■■■■□
Support	■■■■■
Consumer Value	■■■■■

Comments: The mapmaking program for the Mac. Powerful, flexible, and easy to use. **Best Feature:** Ability to customize at every level from boundaries to text labels. **Worst Feature:** Unwieldy zoom. **List Price:** $349. Published by Select Micro Systems, Inc., 40 Triangle Center, Suite 211, Yorktown Heights, NY 10598; (914) 245-4670. Version 3.0 reviewed. Requires 512K, two disk drives or hard disk recommended. Mac II and MultiFinder friendly. Not copy protected.

MACUSER RATING

GeoQuery ★★★½

Follows Mac Interface	■■■■■
Printed Documentation	■■■■□
On-Screen Help	None
Performance	■■■◧□
Support	■■■■■
Consumer Value	■■■□□

Comments: Useful database analysis tool. Lets you look at records from a geographic perspective. **Best Feature:** Automatic plotting of records by zip code. **Worst Feature:** Inability to transfer maps to other applications. **List Price:** $349. Published by Odesta Corp., 4084 Commercial Avenue, Northbrook, IL 60062; (800) 323-5423, in IL (312) 498-5615. Version 1.0 reviewed. Requires 1 megabyte and two disk drives. Mac II and MultiFinder friendly. Not copy protected.

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Video Disc-o-Tech

Interactive video is the application HyperCard has been looking for. With videodiscs and HyperCard, home video has taken on new meaning.



MEL LINDSTROM

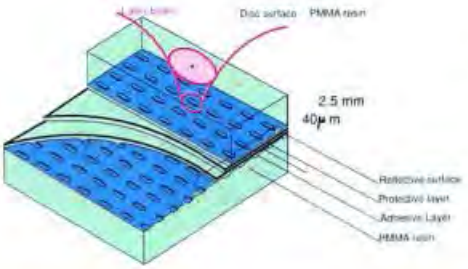
BY RUSSELL ITO

For the past year, HyperCard has been an application in search of an application. While Apple has insisted that it's really system software, a description that usually draws comments about bridges for sale and prime swamp land in Florida, the fact remains that most HyperCard implementations have been about HyperCard — just, stacks to build more stacks.

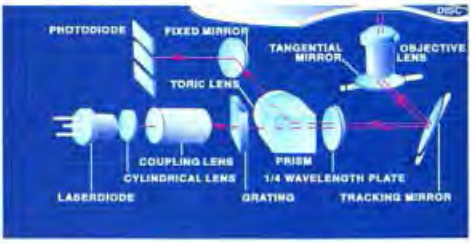
But from the very beginning, Bill Atkinson saw HyperCard as something special. Anyone who witnessed those early demonstrations will remember him hinting — usually in an aside — what would happen when the program was used as a front-end controller with optical media such as CD-ROM and videodiscs. Exactly what those controllers would be, and who would make them, was always left unsaid. But now we have a few answers. Interactive video is a reality, using a HyperCard front end and laser videodiscs that function much like CDs. And Atkinson was right. It is something special.

ACTIVE VERSUS PASSIVE

What makes interactive video so exciting is that it's the antithesis of what makes conventional video so boring. Standard video establishes a fixed relationship between the viewer and the presentation — the former passively watches the latter. In an interactive situation, viewers choose the material they want to see. There are no fixed



Videodiscs store data as a series of pits. A laser beam reflecting off of the pitted surface results in a modulated signal that is then converted into an electrical composite audio/video signal.



The modulated laser beam reflected from the disc passes through a complex optical system to a photodiode matrix that converts the laser light signal into an electronic signal for playback processing. The photodiode also provides the servo signals for the multiple servos that the playback system uses to track in proper mechanical and optical alignment.

paths or sequences, and this is exactly why HyperCard, with its nonlinear approach to information, is the perfect interface.

THE SHOPPING LIST

Putting an interactive video system together starts with getting the right hardware. In order of importance, the basic components are a Mac (Plus, SE, or II), a hard disk with HyperCard, a compatible videodisc player, a TV or video monitor, and the appropriate cables. Chances are you already have the first two items, and if you don't, you should put this magazine back on the newsstand, go buy them, then come back and buy this magazine. The television is another item you probably already have, though you should know that a monitor-style set (one that accepts direct composite video and audio input) is preferable. The videodisc players themselves, however, and the cables that connect them, are another matter.

THE PLAYER DRAFT

The type of videodisc player you'll need probably isn't the model you'll find at your local stereo/video store (or super store, as the case may be). A "Level III" player is required, and its most important feature is an RS-232C serial port. (See sidebar, "Telling the Players With and Without a Program" for an explanation of the differences among Level I, II, and III machines.) Manufacturers of these industrial-quality units include Pioneer, Sony, and Hitachi, but in preparing this story, I found that Pioneer's line, particularly the LD-V4200, was the most widely supported among stackware developers.

Because of the wide variety of features a manufacturer can pack into a player, there is no standard cable for connecting one to your Mac.

I.V. CABLES

Once you've assembled the major pieces of the system, you still have to connect them, and here you have to be careful. Because of the wide variety of features a manufacturer can pack into a player, there is no standard cable for connecting one to your Mac, so your best bet is to consult the manufacturer for the proper cable when you buy the player. And don't expect a cable from one manufacturer to work with another's player. A Pioneer cable, for example, might not work with a Sony player, and vice versa. Because of the feature situation, you probably won't even be able to use the same cable within a single company's line of players. The Pioneer 4200's cable, for example, won't work with their 6000 series units. But you'll still have to visit an electronics or stereo shop to pick up cables to run the player's video and audio outputs into your TV.

PUTTIN' ON THE DISCS

Much like videocassettes, videodiscs come in two formats: CAV and CLV. Unlike their videotape cousins Beta and VHS, though, both types of videodisc can be played on the same machine. If you can imagine a record spinning backward with the stylus moving from the center to the edge, you'll have some idea of how a videodisc and laser pickup head work. Both types of discs are read in the same manner, but the way of encoding the data on the disc is radically different.

On a CLV (Constant Linear Velocity) disc, the number of frames per revolution increases as the head approaches the disc's outer edge. At the center, the head will read one frame per revolution, but at the outermost track, it'll read three frames. Because of this, CLV discs are sometimes referred to as extended play, and they can hold twice as much data per side as a similar CAV unit (60 minutes versus 30). But CLV also has some severe limitations. The trade-off for the extra running time is a limited variety of special effects. Viewers usually can search for a particular video segment by time (hours, minutes, seconds), and sometimes by chapter, but that's about it. CLV discs can't perform the kind of random-access functions necessary for true interactive video.

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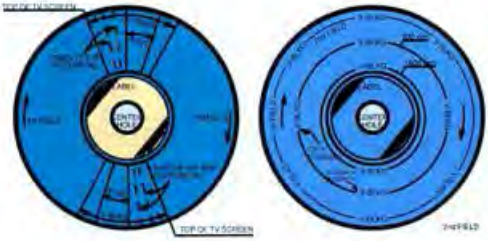
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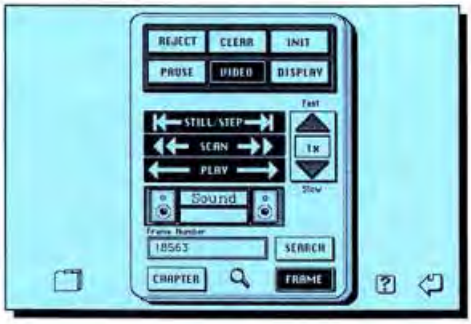
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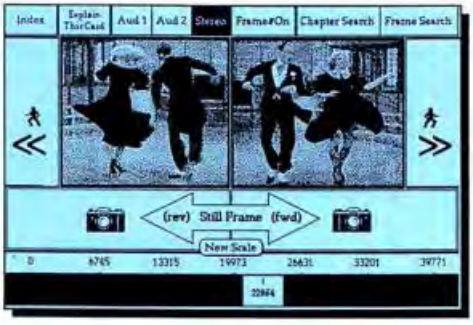


Because CAV (or standard play) videodiscs are encoded with only one frame of video information per revolution, they're capable of a full range of special effects, including freeze frames and step motion.



These control panels from Optical Data, Videodiscovery, and Voyager all perform the same basic functions, such as play, step, and scan (forward and reverse), still frame, audio on or off, and frame numbers on or off, but their graphic implementations are radically different.





Unlike CLV, CAV discs maintain a constant frame rate of one frame per revolution regardless of where the pickup head is in relation to the disc's edge, and this makes it possible for the player to deliver the kinds of effects interactive video requires.

CAV (Constant Angular Velocity) discs, however, do support effects such as freeze frames, step motion, slow motion, and direct frame access, and this makes them ideal vehicles for interactive video. Unlike CLV, CAV discs maintain a constant frame rate of one frame per revolution regardless of where the pickup head is in relation to the disc's edge. This makes it possible for the player to deliver the kinds of effects interactive video requires.

THE SOFT STUFF

Just as Bill Atkinson promised it would, the real breakthrough in interactive video has come through software — namely, HyperCard. At the moment, the three companies most active in the market have been Optical Data, Voyager, and Videodiscovery. All three firms make stackware for the CAV discs they either manufacture or distribute, and they all have their own unique drivers. (For more on videodisc player drivers, see the sidebar "Drivers, He Said"). Regardless of who makes them, the stacks, at the very minimum, support the basic functions

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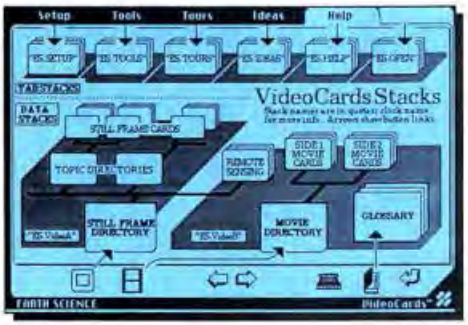
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How complex can a set of linked stacks be? Take a look at this map for Optical Data's Earth Science stacks.

a user would expect: play, step, and scan (forward or reverse); still frames; audio (on or off); frame numbers (on or off); video blanking (that is, does the screen go blank during a search), and play from-to. The dedicated stacks, those created for a specific disc, also function in similar ways. Each still-frame or video sequence on the disc has an associated data card in a stack. When the Mac retrieves the card, the video image appears on the TV.

OPTICAL EFFECTS

Optical Data's line of CAV videodiscs, and associated stackware, which it calls VideoCards, is aimed at the education market. These "visual databases" cover the Life, Earth, and Physical sciences. In addition to the stacks, Optical Data also provides lesson plans for teachers who want to use the discs as the basis for their classes.

As an example, I took a look at the first of the Earth Science discs (the full set is three discs). It came with five disks full of stacks, including one that contained the auto-demo. The stacks are all linked and, in addition to the standard functions, they'll perform keyword searches that will list and show frames or sequences with criteria that match the keyword. Included are a glossary of terms, a Tours stack that will store a custom "video lesson," and a Mark and Edit stack that enables users to compile their own programs.

For most teachers, the Tours and the Mark and Edit stacks will probably be of greatest interest. The Tours stack lets the user create and store a personal route through the data. A blank template card is included, but there aren't any predefined Cut and Paste buttons. Video scripts are provided in another stack, but it's up to the author to implement them. Because building a Tour requires the user to start virtually from scratch, fluency in HyperTalk is a major advantage — if not an outright necessity.

The Mark and Edit function works in conjunction with the keyword search operation, Search and Show. To start building an editable list of images, the user enters the Mark and Edit mode on a blank Mark and Edit card. Now he can use any of the tools in the stack, and all he has to do to add a still frame or a sequence to his list is click in the tiny select box on each data card. The frame or sequence numbers will automatically be written to the Mark List, from which they may be cut, copied, and pasted into the Edit List, just like any other text entry. The Search and Show function is especially handy here, because it quickly compiles a list of all the stills and sequences available and enables you to preview

Drivers, He Said

Just like a printer, a videodisc player needs a program called a driver to allow it to interpret a HyperCard script as a command. Unfortunately, the first drivers developed were player-specific rather than command-specific, so a stack built with one set might work with a Pioneer player, but not with a Sony, and vice versa. This was more a result of chance than conspiracy, as the first drivers were designed more as experiments than anything else. For the technology to fulfill its potential, the underlying drivers can't remain at this primitive level. Apple is therefore introducing the HyperCard Videodisc ToolKit, a standardized set of command-specific drivers that will work with any machine.

Apple's generic driver is actually a set of HyperTalk XCMDs (external commands) arranged in a three-tier hierarchy. The highest level takes the command (Play Video Forward, for example) and the arguments (from frame 1,000 to frame 3,500) then checks a global variable to find out what kind of player is on line.

At the moment, the ToolKit supports only five players: the Pioneer 4200 and 6000; the Sony 1500 and 2000, and the Hitachi 9550. Because Apple has openly expressed a desire to stay out of the software market, the development of any player-specific drivers for future disc players is being left to the hardware manufacturers or third-party developers — a leap of faith that may or may not prove justified.

Once the driver has determined that a player is on-line, the XCMD passes down to the second level, where it's formatted for the particular player. Some players, for example, can accept a command only as a hexidecimal string.

That string then tumbles down to the third layer, a serial communications transport layer, which sends the ASCII bytes out to the player, which then executes the command.

For stack hackers, the ToolKit's three-part architecture makes it possible for entire layers of XCMDs to be swapped out or modified without affecting appearance or performance at the user level. The goal is to achieve transparency at the user level through the use of a consistent set of HyperTalk extensions at the scripting level.

Initially, the ToolKit, which should be released by the time you read this, will be available only as a developer's tool from APDA. Any developer designing a stack can incorporate Apple's drivers, and Apple will also license the source code to commercial developers.

And for anyone who wants to explore interactive video but isn't a developer, don't worry. By the end of the year, Apple will be publishing the ToolKit as a book that will include the disks with the drivers, so you'll be able to buy it over-the-counter.

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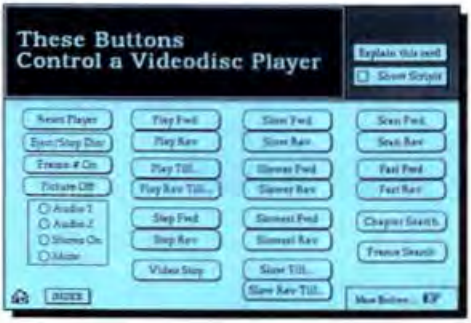
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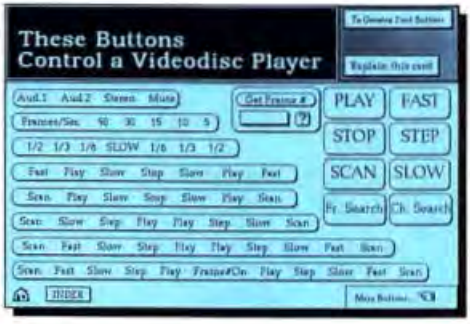
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You need buttons? You got buttons. The Voyager Videostack provides two cards' worth of predefined player controller buttons that you can cut, copy, and paste into any stack you want.

Telling the Players With and Without a Program

Interactive video becomes interactive only when the player can accept commands from your Mac, so when you buy a videodisc player, it's important to pick the right one. Videodisc players come in three levels of sophistication, appropriately enough, known as Levels I, II, and III. Only the Level III machines, though, can accept an external computer as their controller.

Level I players are essentially home units. They aren't programmable except in the sense that a remote control can give the viewer access to a disc's contents.

Level II machines are more sophisticated. These players have chips that make it possible to program them either manually, using the remote control, or automatically from the videodisc itself. Some discs come with a program already encoded on them. When the disc is loaded, the program is dumped into the player's memory, and the viewer can then work with the video interactively by using the remote. For example, on a disc of travel information, the viewer might call up a restaurant's particulars by responding to a series of menu queries using the remote control.

The program, however, exists only in the player's memory and can't be saved. Consequently, every time you turn the player off, the program will be erased, although some players, like the Pioneer 6000 series, can actually hold the program in memory for up to 72 hours after power off.

Level III players are the Rolls-Royces of the videodisc world. They can be connected to an external computer — from a Mac to a mainframe — and that computer can then control the player's operation, making it possible for the user to move from video segment to video segment as freely as necessary. Level III players, also called industrial models as they're built to much higher durability standards than home units, aren't widely available. You'll have to order one either direct from the manufacturer or from companies that make interactive video products. But be prepared: These machines aren't cheap. They start at around $1,000.

them by just clicking on the box next to the frame number. Once the list is finished, selecting the ID number on the Mark and Edit card and clicking "show image only" or "show image and its data card" will recall the visuals from the disc.

Because the technology is so new, VideoCards is still evolving, and in fact, the documentation was being revamped while this was being written. So it's impossible to tell if any of the difficulties I ran into will still be present by the time you read this. One problem that probably will remain is the process you must go through to copy the VideoCards to your hard disk.

The stacks are so large that some of them have been split over several disks and have to be rejoined when they're mounted on your hard disk. To do this, you have to use a program called DivJoin. Now this isn't particularly difficult, but it is time consuming (it can take up to fifteen minutes), and it can be confusing, especially if you insert the disks out of order. The new documentation may make this clearer, but I suspect that the procedure will remain a minor, though not insignificant, stumbling block.

NOW, VOYAGER

Voyager's primary entries in the interactive video world are The National Gallery of Art Laserguide and The Voyager Videostack. Like Optical Data's VideoCards, the National Gallery Laserguide is a companion stack for a specific disc, in this case The National Gallery of Art videodisc. The Videostack, on the other hand, is a general-purpose toolkit for building your own video guides.

The National Gallery videodisc contains a complete archive of the painting and sculpture collections of the National Gallery of Art in Washington, D.C., and contains a total of 1,500 images. Voyager's stack lets the user search the archive by artist, nationality, period/style, date, medium, and subject. Notes can be appended to any of the cards in the stack, and the archive can then be searched on those notes. As with the Optical Data stacks, you can also mark images and auto-

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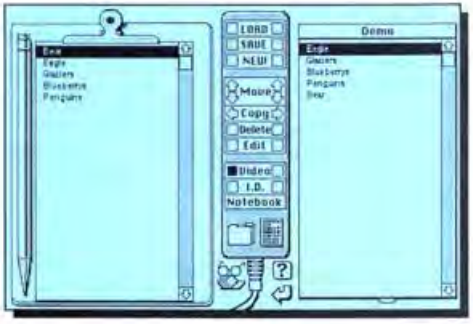
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Voyager's National Gallery of Art Laserguide uses data cards like this one for every image in the National Gallery of Art videodisc's archive. The archive can be searched on any of the fields. The writing hand icon is for attaching notes. The magnifying glass indicates an enlarged view of the work, and the movie projector indicates a video sequence.



Videodiscovery's Bio Sci stack employs an elegant use of the graphic interface for building slide shows. The clipboard on the left holds all tagged video images, and the field on the right is the final edited list of images that can be saved for future reference.

matically assemble them into a slide show.

Unlike the dedicated stacks, The Voyager Videostack is a toolkit for creating your own video demonstration stacks. While it doesn't support the extensive linking of the specialized stacks, it will let you create a controller for discs that don't otherwise have one.

The Videostack comes with a set of predefined buttons for all the basic player functions, and these can be pasted into any other stack, just like a regular button.

There's also an Event Maker that will automatically create a button for any event you define. Buttons created here are pasted to the Button Card, a sort of scrapbook for holding buttons that can then be cut, copied, and pasted into any other stack.

The Videostack comes with everything you'd need to create your own video demo stack — including a driver installer. Other than the Apple Video Toolkit discussed in the sidebar, this is the only such package I found, and it was also the only one shipping at press time.

A NEW VIDEODISCOVERY

Videodiscovery's Bio Sci stack is a HyperCard guide to their Bio Sci Videodisc, a visual database for the biological sciences. Although the stack isn't as thoroughly cross-referenced as its Optical Data counterparts, it is elegantly designed and easy to use.

The Bio Sci stack is a graphically oriented controller that takes advantage of HyperCard's database capabilities to supplement the disc's visuals with additional information. In the Biome stack, for example, the Mac screen displays a map of Washington state with icons representing its various biomes, or environments. Clicking on one of these brings up a representative video image of this environment, while the Mac supplements the image with a description of the biome, data on its latitude, elevation, rainfall amounts, temperature range, and lists of typical plants and animals. Changing one biome's statistics will bring up a data card for a different biome, along with its associated visuals. The flora and fauna lists are active, and selecting an item will bring up that item from the videodisc.

The Bio Sci stack also supports keyword searches on common or scientific names, as well as subject/classification. Such searches can form the basis for slide shows, and Videodiscovery's interface should be familiar to anyone who's ever used the Font/DA Mover: One side of the screen shows a clipboard with the complete list of all the marked images, and the other side shows a blank field into which the desired images can be moved. Separating the two fields is a representation of a remote control with clearly marked buttons. Once the desired list has been assembled in the

I Got Rhythm, I Got Movies

Movie buffs might think that an interactive videodisc system would be perfect for their favorite pastime, but unfortunately they'll probably be disappointed. Most movies on videodisc are issued in CLV format, so freeze frames and step motion aren't possible, but there is one major exception.

The Voyager Company, makers of The Voyager VideoStack and the National Gallery of Art Laserguide, also makes The Criterion Collection, a series of classic films (with some new releases, such as *The Princess Bride*) on videodisc, primarily in CAV format. The classics are often transferred from the original negatives and usually presented with a variety of supplementary materials, including production stills, trailers, audio essays by noted film historians, and even additional footage. Among the titles available are *Citizen Kane, The Magnificent Ambersons, Grand Illusion, Swing Time, The Graduate, Black Orpheus,* and *Hidden Fortress*. The selection isn't enormous, but it's much better than nothing. These will be harder to find but are well worth the effort for the serious cineast.

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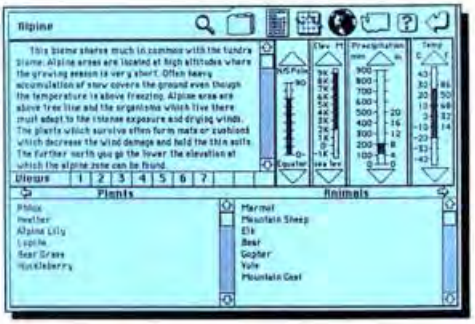
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In Videodiscovery's Bio Sci stacks, the user can explore Washington state's various biomes, or environments, simply by clicking on a button. This data card is linked to seven representative views of this biome on the videodisc. The Plants and Animals lists are active, and the sliders can be changed to match another biome.

right-hand field, it can be saved for future reference.

A FEW DROPOUTS

While the future of interactive video appears unlimited, one major problem is already apparent. By the time you read this, there should be two sets of drivers on the market. The first was developed last summer, and Apple will have just released (or will be on the brink of releasing) the second, The HyperCard Videodisc ToolKit. What this means for the developers is that they'll now have to make a choice to support the first set of drivers, Apple's ToolKit, or both. Apple, for obvious reasons, has been lobbying both Optical Data and Voyager to adopt the Videodisc ToolKit as a standard, but the developers, equally understandably, are reluctant to do something that would require them to retrofit their installed base and potentially disrupt their current development projects.

The existence of multiple drivers is important at the user end as well. Installing a new driver in a stack that already has one isn't necessariiy as easy as it might sound. Depending on how the drivers are written, the new driver could completely overwrite the existing one, could partially overwrite it, or might not affect it at all.

The result of all this will probably be a standoff that might last a while and that could lead to considerable delay in the further development of interactive video products.

And in a related area, there's the matter of the player-specific portions of the drivers that let the system know which player is on-line and which XCMDs should be used. Since Apple won't produce a separate set of drivers for every Level III machine on the market, the burden falls to the player manufacturers and to third-party developers. Assuming these groups do the job (a big assumption), there's the additional question of distribution — as of now, no one knows how drivers for future machines will be made available, and without them, the developers won't be able to test or complete their programs. (For more on these baby drivers, see the sidebar "Drivers, He Said.")

THERE'S COOL AND THERE'S COOL

Despite all this, the future of interactive video appears every bit as exciting as Bill Atkinson promised it would be. For the first time, users can freely retrieve information from a database regardless of how that database was structured. The front end is infinitely variable and customizable, but the data remains unchanged. With HyperCard leading the way, interactive video is about to turn McLuhan's cool medium into a hyper-*cool* medium.

RUSSELL ITO IS AN ASSISTANT EDITOR AT MACUSER WHO THINKS EVERY VIDEODISC SHOULD BE IN CAV FORMAT.

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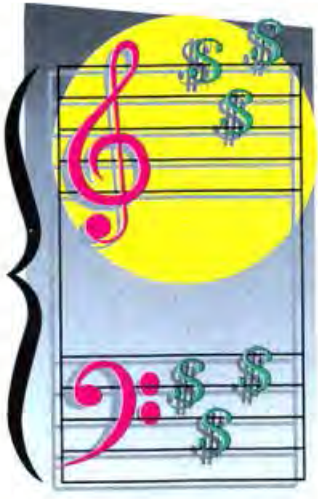


What a Difference a Year Makes

by Freff

Scene 1: the National Association of Music Merchants Show, Anaheim Convention Center, California, January 1987. Hanging 20 feet above the southeast corner of the main NAMM exhibition, an area fondly self-identified as The MIDI Ghetto, is an immense blue-and-white banner displaying the words *IBM MUSIC SOFTWARE*. This is not precisely true. Underneath the banner there are PC MIDI programs on display, to be sure, but there are also Atari, Amiga, and Mac programs — lots of Mac programs — and the people in *those* booths stare upward from time to time in a weird mix of annoyance and envy. The banner looms over them because the companies with PC-based products joined forces to design it, pay for it, ship it, and suffer the bureaucratic hassle of getting it hung. In theory, the partisans of other computers could have done the same. But "You'll never see anything like that for Mac music software," one licensed Mac developer tells me. "None of us could get it together. We'd just argue with each other for months."

Scene 2: NAMM again, but 12 months later. Glossy and glittering beyond anything else in The Ghetto, glowing like a star, it's the Apple Music Software booth. Apple has precisely one music product officially on sale, a simple MIDI/Macintosh interface, but that isn't what this booth is really about. It's about unity, about the triumph of style over style — in this case Apple's style over that of its third-party developers, because the developers are all there, the diverse lot of them, looking exactly alike as they demonstrate software beneath the rainbow sign of the Apple. There are people there wearing suits who wouldn't have been caught dead in a suit before. There are people wearing ties who I would've sworn didn't know how to tie them. No mere banner: Mother company has come to NAMM to roost.



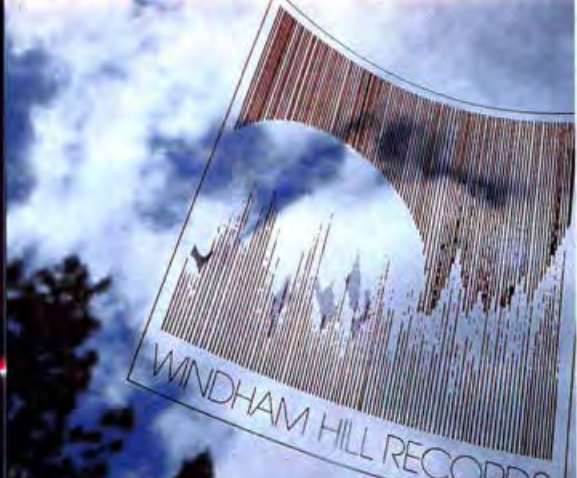
About time, too. According to one industry source, Apple is selling 1,000 Macs a month to musicians in the United States. Though this figure is negligible when compared with overall computer sales, if accurate, it represents $18 to $20 million a year in direct profits. Plug those numbers in one end of the Apple business machine, and they come out the other spelled "Vertical Niche Market." *Market* implies marketing, which in turn implies print ads and promotional literature and trade shows and product videos and all the other accoutrements of the modern sell, which in turn imply somebody (or bodies) on the inside brave enough to bet a big part of their corporate future on the market in question.

What a difference eight years makes! That's how far back I have to go to explain the nature and extent of my bemusement.

In the spring of 1980, I went to Colorado to work on a book project and was confronted not with the IBM Selectric I had requested that my coauthor scrounge for me but with a funky plastic box and monitor that he called an Apple II. I'd seen microcomputers before, but they had always been Tinkertoys for the programming set, something to come home and play games on after a long day wrestling with the mainframe. My deep-running Calvinist streak hadn't been impressed. This Apple II thingoid, though, was different — it was a tool, not a toy. It had word-processing software and could even type in lowercase, thanks to a custom-character-generator ROM that had been hacked onto the side of the box by a local electrowizard. Two sentences in, I was intrigued. At the end of the first week, when I'd turned out as much copy as I normally could in two months, I was addicted. Had to have one. Cost, supply, and service no object. Gimme.

All practical writer-like purposes aside, my coauthor hammered the last nail into the coffin of my resistance by pointing out to me that the Apple could make music. All I had to do was buy two expensive and fragile oscillator cards and their accompanying software, he said, and I could be writing melodies and chords on the screen and playing them out and everything. Not very many notes at once, true, and they wouldn't sound as good as even the cheapest synthesizer in my collection, but what did that matter? Music! Here, at last, was something dear to my heart. For me, writing was and always would be a craft; but music was and always would be a passion. As a child I had strung rubber bands between cabinet knobs and twanged out naive tunes, graduating upward through the years to flutophone, clarinet, piano, guitar, and finally synthe-





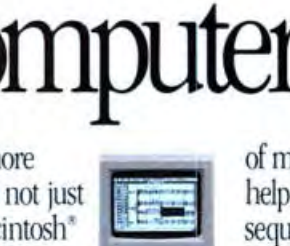




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sizers. Electronic instruments were acquiring microprocessors, and microcomputers were beginning to talk music. I couldn't begin to guess where it was all going, but I was determined to be riding both when they finally collided. It didn't take long, either. Only three years passed before the march of technology and the crunch of economics conspired to unleash MIDI on the world.

In retrospect, in a world in which the ups and downs of the microcomputer industry make front-page news, it seems obvious that micros would affect music as profoundly as they have everything else — 20-20 hindsight. Today Apple sits in Cupertino like the proverbial 5,000-pound gorilla, but back then it was an unknown and struggling startup, just leasing its first building — amusingly enough from GPI Publications, publisher of *Keyboard*, the leading magazine in electronic music. Nobody could have seen the future.

What goes around, as Bob Moog says, comes around better. And those of us who were there from the beginning look at Apple's new musician-targeted marketing effort, smile widely, and can't help but think to ourselves, *we were here — where were you?*

Boring from within, apparently.

"There's always been a lot of interest at Apple in the use of computers in music." That's Elizabeth Gebhart speaking, head of the Apple Music Marketing Group, a committed vocalist and songwriter with her own home MIDI studio. "I was at several NAMM shows before Apple was ever there officially, wandering around and looking at things. So were some other people from Apple. The way a lot of things happen in this company is that if enough people want to make something happen, it happens, and since there were people from marketing and product development and engineering and advanced technology who were either amateur musicians or just very interested in music, we started holding unofficial meetings. Over about a year, the Apple MIDI interface came out of those meetings and out of that an official Music Marketing Group."

Commodore advertises to the music market with a mock-surrealist painting and headlines that proclaim "The computer that works like the mind of a musician" (God forbid). Atari advertises to the music market almost entirely on the strength of having a built-in MIDI interface, and don't bother your simple little head about issues of capacity and compatibility. If anyone in their marketing chains ever touched a musical instrument, it doesn't show. Not so, the promotional materials produced by Apple — mostly.

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straight at the center of the target. "The computer of record where they make the records," says one print ad. There's a discrete little Mac mixed in with the body copy, but the big art is a set of eight photos hitting on the country's most famous recording studios, an approach guaranteed to make any musician with dreams of glory salivate. They use Macs at Electric Lady and Sunset Sound and the Power Station? We're talking the Homes of the Hits here, and for a young player their affirmation goes beyond mere credibility to something approaching Papal Bull. An Apple-produced video (available for $9.95 and $3 postage until December 31, 1988; (800) 538-9696, ext. 750) takes a low-key version of the star-appeal route, giving artists as diverse as Laurie Anderson and Carlos Santana a chance to tell viewers how happy they are with their Macs.

In this video, a broad range of third-party music software is hinted at, but none is directly endorsed. That stamp of Apple approval comes in the form of an official *Apple Music Products Guide* listing nearly a hundred sound-editing, sampling, sequencing, notation, and teaching programs for both the Macintosh and the Apple IIGS. And as if all this weren't enough, Apple Computer has opened close to 200 computer dealers as special music marketing sites, each equipped with a Macintosh, an Ensoniq ESQ-1 synthesizer, and a variety of powerful MIDI software packages.

It's an extraordinary effort, a quantum leap beyond anything yet seen within the field. I should be thrilled. In fact, I am thrilled — but I have my doubts. The typical music business "overnight success" is someone who has been paying dues for years. The same goes when we're talking about the field as a whole. This sudden acclaim, this marketing sound and fury, is simultaneously long-deserved, flattering, and oddly disorienting.

Another promotional piece from the Music Marketing Group says, "There are two things Apple has learned about the music business. 1. The music. 2. The business." But have they? In the next installment of this column, we're going to find out.

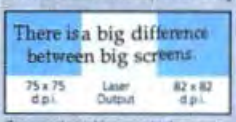
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SECTION

DTP

This month, DTP contains more fallout from the Macworld Expo, plus tips on PostScript prep files, and typeface idiosyncracies. In fact, there's so much to report that we couldn't squeeze it all in. Stay tuned next month for news on the Seybold DTP conference.

If you have tips and tricks of your own to share, send them to DTP, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404.

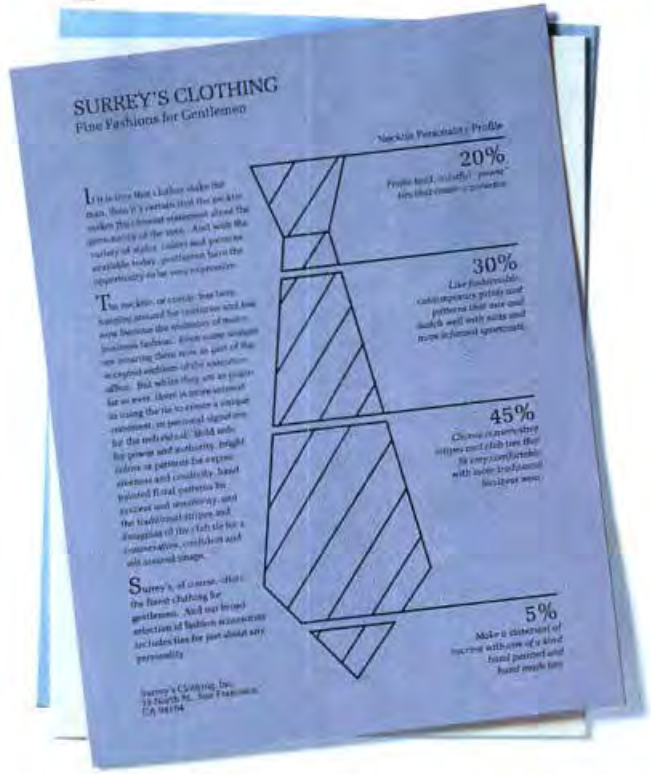
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Ready, Set . . .

Go! Letraset was in overdrive at the Macworld Expo, with four major products in various stages of release. Besides ImageStudio and its new StandOut! presentation software, Letraset announced September ship dates for Ready,Set,Go! 4.5 and the much-heralded LetraStudio.

Version 4.5 of the elegant Ready,Set,Go! page-layout program features fractional point sizes, kerning to .001 of an em space, powerful gray-scale editing, spot color, case conversion, and user-retained defaults. The program — which *still* doesn't require a hard disk — goes for $495, with special upgrade prices for current owners.

LetraStudio (also $495) is a type-customization program that lets you bend, distort, tint, and scale type to any specifications. Using Bezier curves and Pantone colors, you can create signs, logos, advertisements — or just the word *fish* in an appropriate shape. Bit-mapped and PICT images can be imported as templates, and the finished font-work can be saved as an Encapsulated PostScript Format (EPSF) file for use as a graphic in other programs, including, of course, the rest of the Letraset family.

LetraStudio works only with display faces from the LetraFont Type Library ($75 each), 100 of which should be available by year's end. These fonts are graphics files only and can't be installed in your System or downloaded to a printer. Furthermore, they are accessible only through LetraStudio. However, Letraset promises the fonts will provide high screen resolution and true WYSIWYG output when printed to PostScript-compatible printers.

For more information about any of these products, contact Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653; (201) 845-6100.

— Aileen Abernathy

Torturing Type

Broderbund is breathing down Letraset's corporate neck with TypeStyler, a type-manipulation program that takes dead aim at LetraStudio. You can stretch, squeeze, and twist type to your heart's content, add patterns or color, and fit text to Bezier curves. There's a prefab library of shapes and styles, and you can add your own customized versions. You can also import and export paint, PICT, and EPSF files.

At first blush, TypeStyler appears more flexible than the competition, since it lets you torture type from third-party PostScript fonts such as those from Compugraphic. TypeStyler should debut this month with a price tag of $149.95 — nearly $350 less than LetraStudio. For more details, talk to Broderbund, 17 Paul Drive, San Rafael, CA 94903; (415) 492-3200.

— Aileen Abernathy

A Grand Ole Flag?

Do you know what the flag of Sri Lanka looks like? Perhaps you've always wanted to enhance your U.S. map with flags of the individual states. If you fall into these categories — or are just thrilled beyond repair over clip art — DiskArt is for you.

Billed as the EPSF art for serious desktop publishers, DiskArt produces high-quality images in its various packages: Flags of the United States and of the World (both color packages), International Symbols, Creative Theme Art I, and Creative Theme Art Seasonal. All images can be displayed and altered in any program that accepts EPSF files, including FreeHand and Illustrator 88. The packages are also compatible with QuarkXPress, Ready,Set,Go!, and PageMaker. Each package sells for $125. To find out more, you can reach DiskArt at P.O. Box 354, San Ramon, CA 94583; (415) 820-3734.

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Richard Skrinde, *MacUser, September, 1988:*
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Arthur Fuller, *Computing Canada, June 9, 1988:*
"So phenomenally great that it justifies the purchase of a Macintosh just to run it!"

Michael Masterson, *MacWEEK, June 7, 1988:*
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Interleaf Branches Out

A year after its initial release, Interleaf Publisher is turning over a new leaf to improve its compatibility with the Mac world. This high-end DTP program has a powerful multiuser layout system for producing large, complicated documents. New features in version 3.5 include MultiFinder compatibility, an open-font architecture that supports the Apple Font Manager, the ability to convert typed text to graphic fonts, and improved support for the PICT format.

Interleaf Publisher still carries a hefty $2,495 price tag and a system requirement of a Mac II with 5 megabytes of RAM and a 40-megabyte hard-disk drive. However, the 3.5 upgrade is free to registered users of version 3.0 and should be out as you read this. Contact Interleaf, Ten Canal Park, Cambridge, MA 02141; (617) 494-4826.

— Aileen Abernathy

Fonts, Fonts, Fonts

Bitstream has muscled its way into the current font frenzy with two major releases. MacFontware is a library of typefaces that provides high-quality output on all printers, from ImageWriters to Linotronics. MacFontware properly matches character spacing, line endings, and page breaks regardless of the printer used. Ten packages are currently available at $195 each, including eight font families and two groups of headline faces.

The second release, SoftFonts for the Mac, provides high-quality, high-resolution (300-dpi) output on the LaserWriter IISC and ImageWriter. This collection of 35 bitmapped faces matches those found on most PostScript printers. SoftFonts comes in five combinations with varying prices, or you can buy all 35 at once for $695.

Contact Bitstream at Athenaeum House, 215 First St., Cambridge, MA 02142; (617) 497-6222.

— Aileen Abernathy

Compugraphic Joins the Fray

As expected, Compugraphic released the first eight volumes of CG Type for the Macintosh during the Macworld Expo. This venerable typeface vendor plans to release additional volumes from its 1,700-face library by year's end. Each $149 volume contains four weights (roman, italic, bold, and bold italic) and includes both screen and printer fonts for use with any PostScript-compatible printer. And, since Compugraphic's typefaces aren't locked like Adobe's are, they can be manipulated for special effects in programs like Broderbund's TypeStyler.

For more typographic details, contact Compugraphic's Type Division, 90 Industrial Way, Wilmington, MA 01887; (800) 622-8973.

— Aileen Abernathy



Nip 'n Tuck

Although there are 105 defined kern pairs for the Times font on the Macintosh, some folks probably wish for more. Or they want to condense the letters further or separate them completely. Some people are just never satisfied.

EDCO Services realizes this and has solved the problem with LetrTuck. This small (21K), recently released program gives you total control over the letter spacing between any characters in any font. You merely select the font and style, decide which character pair you want to change, adjust the spacing, and check the results on your PostScript printer. You can add new

Express your style with CG TYPE

"**WHOA, MR. CLAUS!** Here's a very special gift idea from Compugraphic.® It's CG TYPE for the Macintosh.™ It's *PostScript*®-compatible. And it comes with a utility—**FontLiner**™ by Taylored Graphics! Until New Years Eve, I can buy a CG TYPE volume for $149, and receive this exciting new program. **A $69.95 value!** With FontLiner I'll be able to convert my CG TYPE directly into *PostScript* artwork and use it instantly with either Adobe Illustrator™ or Aldus FreeHand.™ Then, I'll let my creativity loose on logos or illustrations like this ad. For unique type designs, call **800-MAC-TYPE.**"



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Bold
Bold Italic

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Garamond Kursiv
Garamond Halbfett
Garamond Kursiv Halbfett

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CG Nashville Medium
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Bold Italic

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Bold Italic

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Heavyface Italic
Heavyface Condensed

Volume 13
Branding Iron
Isabella
McCollough
Raphael

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Compugraphic Corporation, Type Division, 90 Industrial Way, Wilmington, MA 01887

cgType™

pairs to the kerning table or delete existing ones. Once you save the changes, they will be reflected in any application that supports kerning.

LetrTuck costs $149 and comes with a money-back guarantee. Contact EDCO Services, 12410 North Dale Mabry Highway, Tampa, FL 33618; (813) 962-7800.

— Aileen Abernathy



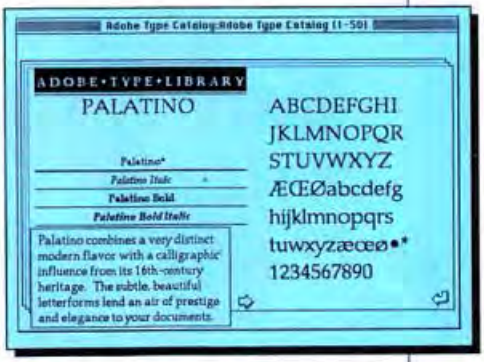
With LetrTuck, you can change the spacing of any kern pair in any font style to suit your fancy.

The Face Is Familiar

If you have trouble distinguishing between Bodoni and New Century Schoolbook, Adobe has the stack for you. The Adobe Type Catalog is a HyperCard stack that serves as an index to the 50 typefaces in Adobe's Type Library. Besides providing samples of each face, the catalog has information on the face's history and usage.

The Adobe Type Catalog is free, and you can get it either directly from Adobe or from a dealer. For more information, contact Adobe, Box 7900, Mountain View, CA 94039; (415) 961-4400.

— Aileen Abernathy



You can check out Palatino and 49 other typefaces in the Adobe Type Catalog. This HyperCard stack has samples of each face, including bold and italic styles, with pop-up windows that provide historical details and tell you how to use the face most effectively.

A Picture's Worth

It may not be a thousand words, but 16 graphic characters are still pretty nice, especially if they comprise their own font. That's the premise of KeyMaster, the latest fontastic product from Altsys. Up to 16 art elements can be imported and organized into a high-resolution PostScript font, which can be installed in your System using Font/DA Mover.

KeyMaster accepts EPSF files from FreeHand and Illustrator 88, as well as PICT and PICT 2 files. The program automatically creates screen fonts from the graphics and has a built-in font editor for touch-ups. The resulting characters are entered in a document just like regular text and can be enlarged or reduced merely by changing the font size. If KeyMaster lives up to its billing, it could eliminate the problems associated with importing many EPSF and PICT files.

KeyMaster has an October ship date and a retail price of $99.95. Contact Altsys, 720 Avenue F, Suite 109, Plano, TX 75074; (214) 424-4888.

— Aileen Abernathy



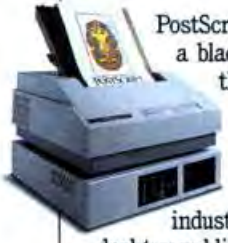
KeyMaster lets you create your own graphic font of up to 16 pictures, symbols, and signatures.

QMS introduces thousands of improvements to PostScript printing.



The new QMS ColorScript™ 100.

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PostScript printing is no longer simply a black-and-white issue. Thanks to the QMS ColorScript 100.

Now QMS has opened your projects to a range of new graphic possibilities using Adobe PostScript®, the industry-standard language of the desktop publishing revolution.

Now, your proposals, presentation graphics and publications can go from gray to glorious. Graphic design color schemes can change with just a single keystroke, not a hundred marker strokes. Even commercial printing proofs and in-house color separations can be produced and color-matched. All this will help save the two things every business needs. Time and money.

QMS worked closely with Adobe Systems, software developers and users to design the

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ColorScript 100. All agree it's a breakthrough. That's not surprising since QMS offers more PostScript products than anyone else.

The ColorScript 100 uses a revolutionary thermal transfer process that produces true 300x300-dpi resolution. That means you can generate thousands of brilliant colors with pinpoint registration that can match the color swatches scattered on this page.

The printer is built around an intelligent controller, running a 68020 processor, equivalent to the one in the Macintosh II. That makes it a powerful computer in its own right. A 16 MHz processing speed makes it responsive. Especially to things like deadlines. You can print an 8½"x11" page in just a single minute. An 11"x17" page in under two.

The system's large 8 megabyte memory can handle complex applications. And a 20 megabyte hard disk offers generous space for downloadable typefaces to complement its 35 resident Adobe typefaces.

Compatibility is also built in. The ColorScript 100 connects with Macintosh®, IBM®, Compaq® and other compatible PCs, along with minicomputers, workstations and mainframes.

That means you can work with Aldus FreeHand™, Micrografx Designer™, Quark XPress™, Adobe Illustrator 88™, AutoDesk AutoCAD® and most programs written under Microsoft® Windows. Plus all the new programs that are being developed to join dozens of other color-compatible applications.

The ColorScript 100 is yet another useful solution from QMS. Solutions that have made us a leader in print technology. That's one fact we don't mind giving you in black and white.

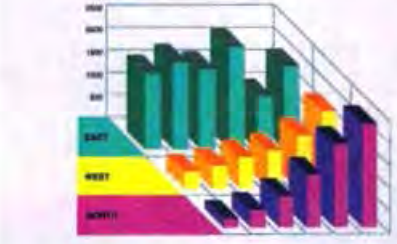
For information on the QMS ColorScript 100, including print samples, a complete list of compatible software and information on financing, call 1-800-631-2692, ext. 203.





Pictured are just some of the ways designers are using the QMS ColorScript 100. The creative director at one design firm notes: "We're doing comps in minutes that used to take hours. The quality is fantastic." A computer design system manager in the Midwest says: "Our clients are getting more options, in less time, at lower costs."





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MAXIMUM IMPACT MINIMUM EFFORT

Creating presentations can be easy. Your thoughts and ideas are ready. All that's needed is StandOut! software for organizing, packaging and polishing them to a persuasive pitch. At its heart is the AutoProduction System. APS combines specialized presentation features with automation and global control to quickly turn your thoughts into well designed, effective presentations. Here's how.

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Words make up over 50% of all presentations and StandOut! shows your words at their best. Professional type control means titles and text look typeset, not just typed. APS' style sheets offer a consistent look as well as fast production. And spell-checking helps you catch typos while search and replace speeds up changes.

Work faster with automated production

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StandOut!'s APS offers automatic chart creation. Just select from 5 chart types, enter the data and see the result. If it isn't right, view the other options by clicking the mouse. And creating the charts in StandOut! saves time when compared with leaving the program and importing work from other applications.

Then try a Macintosh rehearsal

StandOut! can preview your presentation just as the audience will see it. And if the preview suggests changes, APS makes them easy. You can view thumbnails and sort the entire presentation by slide title or image, globally edit text, and update speakers notes and handouts. For a demonstration on how easily you can create your next presentation see your Authorized Letraset Graphic Design Software dealer or call 800 722-0377 for more information.

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PREPPY POSTSCRIPT

Most applications that print to a PostScript-compatible printer make use of a "prep" file that prepares the printer by setting up a PostScript environment with predefined routines, procedures, and variables. For the majority of Macintosh programs, this file is called LaserPrep. With PageMaker, you actually have a choice of prep files: LaserPrep or AldusPrep. JustText, on the other hand, uses no prep file at all.

Most users simply place prep files in their System folders and forget them. A pity, because with just a bit of exploration — mucking around in the innards of these prep files — you can trick programs into doing things they were never intended to do. It may sound intimidating — perhaps even inadvisable — to play around with this, but it's safer than fooling with ResEdit. You never actually modify or edit the master prep file, only a captured copy of it and the document you're printing. How to trap those elusive prep files before they disappear into the circuitry of your LaserWriter? Let's take a look at two examples from PageMaker and MacDraw. (Thanks to a pioneer in this technique, Warren B. Jokinen of Colorado Springs, Colorado, and to Randy Adams at Emerald City Software in Atherton, California, for their help.)

PageMaker 3.0

PageMaker, even version 3.0, lets you print screens of only 10, 20, 30, 40, 60, or 80 percent. If you absolutely require a 50-percent screen, how do you do it? First, go to the page where you want the screen to be. The shade can be set at any of the choices available under the Shade menu. For this experiment, set it at 40 percent. Choose Print from the File menu. When the Print dialog box pops up, make sure Aldus is listed as the Driver. If not, choose Change. . . and select Aldus in the printer-specific settings box. This just means that PageMaker will be using AldusPrep instead of LaserPrep.

After selecting the page to be printed, hold down the Option key while clicking OK in the Print dialog box. Another dialog box appears that lets you save the PostScript file to disk. Click that box and the one that says "Include AldusPrep." Click OK. A message should appear telling you that a PostScript file is being created and saved to disk. When this message disappears, quit PageMaker and open the text-only document that's been created. (If you can't find it on the desktop, look in the System folder.) Since it's an ASCII file, you'll have to open it through your favorite word processor. It'll



PAGEMAKER

Figure 1: **You can force PageMaker to print a 50-percent screen by creating a PostScript file of the page and changing the number just before *PSHADE* to *50.0*.**

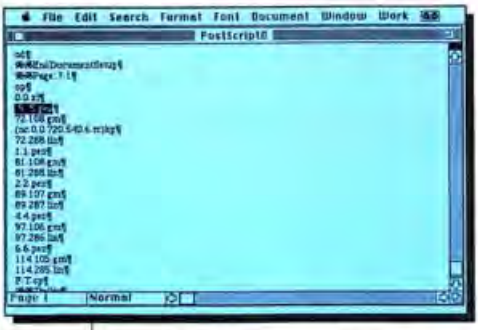
be called *PostScriptxx*, where *xx* stands for the number of the PostScript file. In this case, it'll probably be called PostScript01. This is sort of like doing screen shots, but instead of capturing graphics, you've just captured text. Once it's open, Search for the word *BEGPAGE*. Everything before that is AldusPrep. Take a look at it, if you want, especially at the definition *PSHADE*.

Just after *BEGPAGE*, however, is the PostScript code for the page you're printing. Look for *PSHADE* (see Figure 1). Just before it are the digits *60.0*. Change these to *50.0*, save the file as text-only, and download it to the printer with a program like PostCraft's Postility or PSDownloader from Adobe. The result? You've just coerced PageMaker into producing a 50-percent screen.

MacDraw 1.9

Before Claris released MacDraw II, you couldn't draw hairlines with the program. If you don't intend to upgrade, there is a way to do hairlines if you really need them.

First, open a new document. Draw a line with the first line thickness (1 point) available from the Lines menu. Choose Print from the File menu, and quickly press and hold down Command-K. A message box should inform you that a PostScript file is being created. When this disappears, close the MacDraw document and locate the PostScript ASCII file. Use your word processor to open this file and search for the word `%%EndDocumentSetup` (see Figure 2). Everything before this is LaserPrep, but the PostScript for your page follows it. Look for `1 1 pen`. However, we want a hairline (.5 point in thickness), so change this to read `.5 .5 pen`. The word `pen` is a



MACDRAW

Figure 2: **Older versions of MacDraw, before Claris stepped in, couldn't do lines thinner than 1 point. But if you fiddle with the PostScript of your document, a "receding hairline" can be yours. Here, for example, a 1-point line has been reduced to a .5-point line.**



Figure 3: **Instead of splitting hairs, we're splitting lines. The top line is a .5-point hairline, as created in Figure 2. The bottom four lines show the thicknesses (1, 2, 4, and 6 points) normally available in MacDraw 1.9.**

PostScript routine that has been established by LaserPrep to set the thickness of lines. Close and save the file as text-only, and send it to the printer using an appropriate downloader (see Figure 3 for the results). Once again, by taking the time to probe the intricacies of PostScript, we've tricked our software into doing the "impossible."

Make the effort to experiment with this technique. Users who want to shift into high gear will find it an invaluable method for bypassing their software's shortcomings.

—Gregory Wasson

SHIFTING SHAPES

The backbone of DTP on the Macintosh has always been its WYSIWYG fidelity. That is, you could be assured that what you saw on the screen would match the final printout — most of the time. But a new batch of screen fonts from Apple is straining that backbone and calls into question whether Apple understands the WYSIWYG philosophy anymore.

The problem was first noticed by software engineer Pete Mason, who helped develop FreeHand at Altsys. Mason was working with the new batch of fonts that Apple now distributes with the ImageWriter LQ. These are screen fonts for Times, Courier, Helvetica, and Symbol in extra-large sizes (up to 72 points). He observed that the shapes of several characters differed dramatically between sizes.

For example, the Times percent sign in 24-point looks remarkably different from the 36-point version. An examination of the complete character set in several sizes of all four fonts reveals a number of surprises. Figure 4 shows the same string of characters in two screen sizes and then as LaserWriter output. Notice the shifting screen shapes and the discrepancies in the printed results.

Perhaps the most confusing part of this new batch of Apple fonts is that not only do they introduce non-WYSIWYG anomalies in the jumbo sizes but they also have made some subtle changes to the on-screen character set in the smaller sizes.

This is especially noticeable in Courier. The older version of 24-point Courier, for example, didn't have screen bit maps for the ligature characters Æ, æ, Œ, œ, fl, and fi. (This makes sense, since Courier is a monospaced font and shouldn't allow two letters to occupy a single spot.)

However, the newer version of this same font in the same point size does have ASCII codes for these screen characters. But the LaserWriter doesn't have characters at these ASCII locations, so it won't print anything whether there's a screen character showing or not.

The good news (sort of) in all this mess is that the LaserWriter does not use the screen fonts to print Times, Helvetica, Courier, or Symbol (or any laser font for that matter). The shape of each character is defined in the LaserWriter just one time (as an outline) and is used to print in any point size.

Not so, however, if you're using an ImageWriter or QuickDraw laser printer. In those cases, the shapes might shift in the printout as well as on screen — and not always in sync, either. For example, you might be looking at a 24-point Times character, print at Best quality to an ImageWriter LQ, and find that the shape of the character has changed. That's because the LQ uses a 72-point version of the font to print 24-point text at Best quality.

—Dave Valiulis

Symbol Sampler

Helvetica

24 point

"'^~¢®©™µ√ƒ†‡‰

36 point

"'^~ ¢®©™µ√ƒ†‡‰

LaserWriter

"'^~¢®©™µ√ƒ†‡‰

Geneva (Shift-Option)

9 point

10 point

12 point

14 point

18 point

24 point

LaserWriter Ÿ

Courier

12 point (old)

#'@Q~ß□¥Ω□□□/□□□

24 point

#'@Q~ßÆ¥ΩæŒœ/fifl‰

36 point

#'@Q~ßÆ¥Ωæ Œœ/fifl‰

LaserWriter

#'@Q~ßÆ¥ΩæŒœfifl‰

Times

24 point

"%'^~¢√ƒ†‡‰

36 point

"%'^~ ¢√ƒ†‡‰

LaserWriter

"%'^~¢√ƒ†‡‰

Symbol

24 point

∀∃×∅⊄

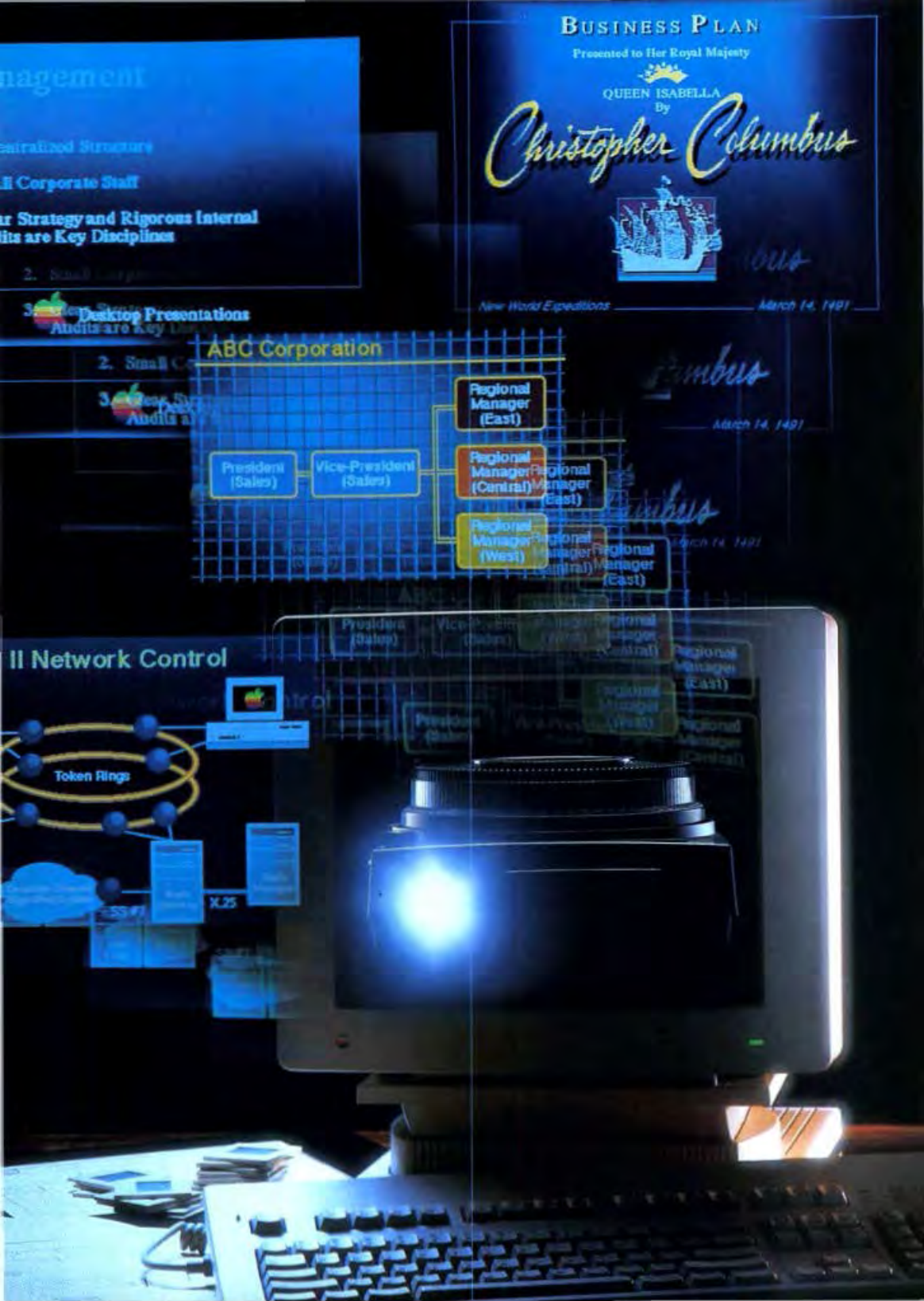
36 point

∀∃× ∅ ⊄

LaserWriter

"$¥ΔÀ

Figure 4: What you see versus what you get:
This sampler illustrates the differences between the screen shapes and LaserWriter output of certain characters in Times, Helvetica, Courier, Symbol, and Geneva. Although the symbols have been photographically reduced, the shapes remain the same.


Desktop Presentations
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The Presentation Pitch

Desktop Presentation has risen from being just a marketing gimmick to spawn a whole new genre of software. We put the three top slide-making programs through their paces.

The graphics capabilities of the Macintosh make it so well suited to preparing presentations that when the term, *desktop presentation,* appeared the real surprise was that it had taken so long to show up. The first presentation package, just two years ago, was MORE, which was the sequel to the popular outliner ThinkTank. MORE added the ability to prepare bullet charts from outlines. A few months later, PowerPoint followed — the first slide-oriented package with the ability to print slides, notes pages, and handouts.

The desktop-presentation market might have grown slowly from there, were it not for the Macintosh II, with its excellent color capabilities. As an added attraction, film recorders that shoot 35-millimeter slides began coming down in price. With a new color Macintosh and affordable color-output devices, the hardware was practically begging for more powerful presentation software.

Microsoft, which had acquired the company that produced PowerPoint, responded to the demand for color with PowerPoint 2.0. Cricket, long

BY ROBERT R. WIGGINS

JOOK LEUNG

known for their graphics software like Cricket Draw and Cricket Graph, entered the fray with Cricket Presents. Manhattan Graphics and Letraset, the team responsible for the desktop-publishing package Ready,Set,Go!, produced ReadySetShow. *[At press time, Letraset had decided to change ReadySetShow's name to StandOut!. Until the inventory is replaced, the program can be bought under both names. — Ed.]* By the time you read this, Symantec's Living Videotext division should be shipping MORE II (see sidebar), and Aldus may be shipping Persuasion. Desktop presentation is here to stay, and all these packages are very good.

PRESENTING . . . SLIDES

The three color presentation packages available at press time were PowerPoint, Cricket Presents, and ReadySetShow. These three have more similarities than differences, so let's look at the overall picture first.

The basic element of a presentation is a slide (Cricket Presents calls it a frame), which is essentially a page. A collection of slides is a presentation, which is the document created by the programs. Slides can be different shapes and sizes, depending on the output device they will be printed on, but all the slides in a particular presentation are the same shape and size, generally either 35-millimeter or 8½ x 11 inches. Slides can be arranged in any order, and all three packages offer both visual sorting and sorting by slide title. Slides can also be copied from one presentation and pasted into another.

You can place various objects on a slide by using drawing tools that make objects like ovals, circles, rectangles, and squares. All three programs have text objects for entering and formatting text information. If you're familiar with drawing programs such as MacDraw, SuperPaint, or Cricket Draw, the drawing environment of these programs will be easily mastered.

Objects placed on slides are layered, which allows flexibility in placement. The back layer of a slide can consist of a master slide, and all other objects

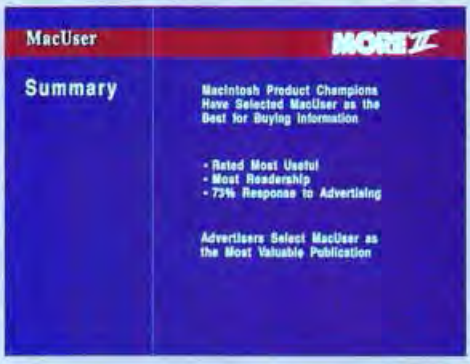
MORE II Charts New Territory

We got a sneak preview of a prerelease version of MORE II, and since it should be available by the time you read this, it deserves more than a passing mention.

MORE II adds many new features to its outliner, but of more interest are the extensive enhancements made to its bullet chart environment. As with the original MORE, bullet charts can be generated automatically. Once a chart is created, though, a drawing environment like that of the other presentation packages is available, and MORE II has all the features common to the other programs except a visual slide sorter, since the slide order is determined by the outline.

MORE II offers many drawing tools and functions in full color. MORE II also has alignment, centering, and grouping of objects. Because of the underlying outliner, MORE II has most text-handling features, including a spelling checker. MORE II has a feature called "rules" that is a powerful style sheet with different rules sets available in the outline, bullet chart, and tree chart modes. Using rules, an outline can be displayed in the Times font at 12 points with black text on a white background, while the same text on the charts is Helvetica 36-point yellow text on a blue background.

MORE II's best feature is its slide show, which is far more powerful than the other presentation packages. It's designed so that a presentation on a multiple-monitor Macintosh II can be made on one monitor facing the audience while the speaker sees a control panel and notes on a second monitor. The control panel keeps track of the overall time of the presentation, the time a slide has been up, and tracks



MORE II integrates a powerful outliner with a full-featured drawing environment. Using a master background, attractive slides can be automatically generated from the outline.

these against a budgeted time. MORE II offers several different "build" capabilities so that various items on a chart can be highlighted in turn as each is discussed. For the ultimate in on-screen presentations, MORE II supports the Kodak ADB remote-control unit that allows the speaker to be away from the Macintosh and still control the show, including random access to charts (very helpful when the boss wants to go back to a previous slide).

Another advantage of MORE II is its extensive import and export capability of both text (Word, MacWrite, ASCII text, ThinkTank, MORE, Grandview) and graphics (PICT, Paint, EPSF). MORE II also offers open architecture translation drivers so additional file formats can be added easily in the future. Also, MORE II uses virtual memory, so the size of your presentation is limited only by available disk space.

When you're deciding which presentation product to buy, be sure to take a look at MORE II. If most of your presentations will be made on a Macintosh screen, MORE II will be your best choice. MORE II was expected to ship in early October and will retail for $395. Registered MORE users can upgrade for $89. A promotion campaign gives users of PowerPoint, Cricket Presents, and ReadySetShow the same upgrade price if they send in the first page of the other program's manual. MORE II is published by Symantec, 10201 Torre Avenue, Cupertino, CA 95014; (408) 446-9994.

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We've been asked why Cricket Software would introduce a black and white paint program when the whole world is making so much noise about color. Frankly, we feel it's obvious: There are more than 1.5 million* monochrome Macintosh® users — Apple® hasn't abandoned them and neither have we. Plus, we felt there was still a lot of room for improvement over the current best selling paint program.

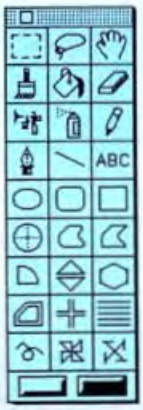
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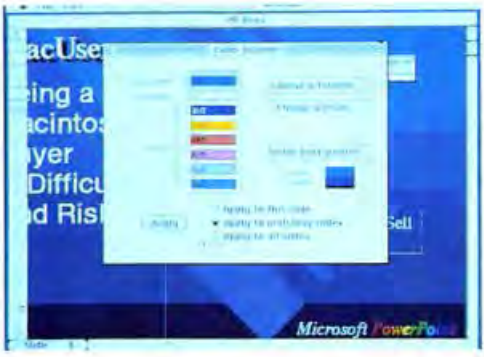
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will appear in front of this background. Objects with solid fills obscure objects behind them, although all three programs offer transparency as a fill "color" so that objects in the back can be seen through foreground objects if so desired.

All three programs offer flexible output. Slides can be printed on any standard printer in black-and-white, or on a color-output device like a slide recorder with an appropriate Chooser driver. All three programs print handouts of the slides, with a choice of the number of slides per page. All three also let you create and print note pages, which have a small version of the slide and any speaker's notes that you care to add. You also can use the Macintosh screen to display a slide show. The on-screen slide show feature is most useful on a large color monitor attached to a Macintosh II or with one of the overhead projection units that have come onto the market during the past year.

While all three programs share these similarities, they all have their distinguishing characteristics. Let's look at each of the three in turn.



One of the hardest things to select, especially for non-artists, is an attractive and effective color scheme. The best-planned presentation can be ruined by garish or hard-to-see colors. PowerPoint comes with many predefined templates, designed by professional artists, that can be easily applied to a slide or to an entire presentation.



PowerPoint offers a spelling checker (small inset window) and formatted text using a ruler (above the text on the right). Indentation and tab stops can be easily set by pointing and clicking.



PowerPoint has no integrated charting facility, so the chart on this slide was created in Excel, then copied and pasted into PowerPoint. All the color attributes of the chart were defined in Excel.

PRESENTING . . . POWERPOINT

PowerPoint 2.0 is not all that different from its original version. The major change is the addition of color, and here Microsoft has done a phenomenal job. Genigraphics, an experienced slide-preparation company, has designed a variety of examples and chosen some attractive and effective color schemes. Microsoft has added special support for color schemes, so it's possible to take an existing presentation (either black and white or color), select a new color scheme, and have it automatically applied. This makes it easy to create an attractive presentation, even if you have no artistic ability or are color-blind.

Text handling has been substantially improved with the addition of find-and-replace logic and a spelling checker. The ability to import ThinkTank and MORE outlines and automatically generate slides is still included.

PowerPoint's weakness remains the same in version 2.0 as in the original — the drawing environment. PowerPoint offers the fewest types of drawing tools (see the "Slide-Making Software Shootout" chart), with no charting capabilities at all. The biggest drawback is the lack of alignment and grouping capabilities. Objects must be aligned with one another manually, and shift-selected or drag-rectangle-selected before they can be moved as a group.

Despite its paucity of drawing tools, PowerPoint can be used to make some spectacular slides. Several examples prepared by Genigraphics show novel and unusual effects combined with imaginative color. With its color schemes and text style sheets, along with the Genigraphics-designed examples, PowerPoint makes it easy to

Slide Making Software Shoot-out: A Feature-by-Feature Comparison

Features	POWERPOINT	CRICKET PRESENTS	READYSETSHOW
Drawing Tools			
Ovals	yes	yes	yes
Rectangles	yes	yes	yes
Rounded rectangles	yes	yes	yes
Lines	yes	yes	yes
Arcs	no	yes	no
Triangles	no	no	yes
Polygons	no	yes	no
Freehand	no	yes	no
Border	no	yes	no
Diamond	no	yes	yes
Rhomboid	no	yes	yes
Full color	yes	yes	yes
Color schemes	yes	no	no
Colorizing	yes	yes	no
Alignment	no	yes	yes
Centering	no	yes	no
Grouping	no	yes	yes
Layering	yes	yes	yes
Templates	many	some	few
Graphing Tools			
Types of graphs	none	8	5
Depth (3-D)	n/a	yes	shadows
Picture bar charts	n/a	no	yes
Exploding pies	n/a	no	yes
Text Tools			
Free-form text	yes	no	no
Structured text	yes	yes	yes
Tables	no	yes	no
Decimal tabs	yes	yes	yes
Centered tabs	no	yes	yes
Justified tabs	no	no	yes
Right-aligned tabs	no	yes	yes
Tab leaders	no	no	yes
Leading	yes	yes	yes
Find/replace	yes	no	yes
Spelling checker	yes	no	yes
Glossaries	no	no	yes
Color text	yes	yes	yes
Style sheets	yes	no	yes
Slide Tools			
Title sorter	yes	yes	yes
Visual sorter	yes	yes	yes
Slide show	yes	yes	yes
Special effects	no	yes	yes
Master slide	yes	yes	yes
Date stamping	yes	yes	glossary
Time stamping	yes	yes	glossary
Output			
Handouts (slides per page)	2, 3, 6	2, 3, 4, 6	2, 4, 8
Notes pages	yes	yes	yes
Affiliated slide preparer	Genigraphics	Autographix	none
Import/Export			
Text import	MORE, ThinkTank	none	ASCII, WriteNow, MacWrite, Word
Text export	none	none	none
Graphics import	PICT, PICT 2, EPSF, Paint	PICT, PICT 2, EPSF, Paint	PICT, PICT 2, EPSF, TIFF, RIFF
Graphic export	Scrapbook	none	PICT

quickly produce attractive and striking slides.

In addition to producing the fine graphic examples, Genigraphics has an arrangement with Microsoft to offer slide preparation services to PowerPoint users. At present, this involves sending in disks containing presentations, but the two companies are working together to implement a modem transfer capability. This arrangement makes professionally produced 35-millimeter color slides simple to produce. For low-volume users the Genigraphics service is much more cost-effective than spending thousands of dollars on a slide recorder.



Presents includes a charting environment capable of producing several types of business graphs in full color. While not as powerful and flexible as separate charting programs, it offers enough options for most simple charts.

PRESENTING . . . PRESENTS

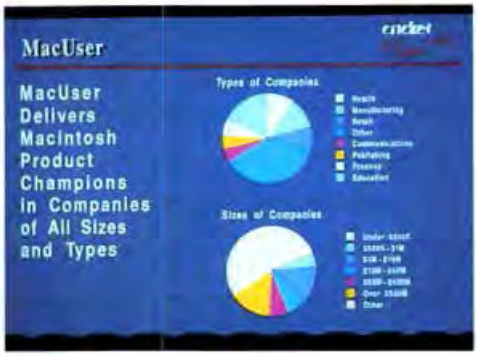
Presents shares many features with its fellow Cricket products. The drawing environment shows the influence of Cricket Draw, and the charting capability is reminiscent of Cricket Graph. This is both good news and bad news, depending on how you feel about the Cricket interface — Cricket products often require that you click on things where other programs would use menus.

Because of its heritage, Cricket Presents offers the widest range of drawing tools of the three programs. Presents also has complete object-alignment, centering, and grouping capabilities. It's not a replacement for Cricket Draw or MacDraw, but you'll seldom need more drawing power for creating slides.

Presents also has an integrated charting facility that makes constructing simple and even some complex graphs quick and easy. Again, it's not a replacement for a full charting package like Cricket Graph or even Excel, but for modest charts it gets the job done.

Presents even has a table tool for creating spreadsheet-like tables quickly and easily. No spreadsheet functions are included, but it's easier than laying out all sorts of tab stops in the text and then drawing boxes.

For working with examples and templates, Presents has an excellent template library facility. You can browse through templates until you find an appropriate one. Then you can apply the template to a slide or to a range of slides. Templates can also be applied to the master slide or to a particular slide's background.



This slide features two pie charts generated by Presents. The background is a template supplied by Cricket, and the Presents logo is taken from an example slide.



ReadySetShow's desktop publishing heritage is apparent in its ability to run text around irregular graphics. This is not a feature you will often need to prepare slides, but it does illustrate the power of the program.

For slide production, Cricket has teamed up with Autographix, and Presents includes a modem transfer utility that makes shipping slides for preparation simple and quick.

Presents' weakness is text handling. There's no facility for importing text — not even from Acta, the desk accessory outliner that's bundled with the package. There's also no spelling checker, nor is there a find-and-replace mechanism. Another major flaw is the program's inability to export slides, graphics, or text. If you want to



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use an output device that does not have a Chooser-level driver, you're out of luck.

A minor flaw is that the hierarchical Color menu offers only the names of colors, and only 64 of them at that. Since the Mac II offers up to 16 million colors, it's hard to conceive of them all having names and even harder to conceive of being able to visualize a shade from its name. Even when dealing with only 64 names at a time, this can be annoying.

PRESENTING . . . READYSETSHOW

ReadySetShow comes from the company that produced Ready,Set,Go!, and the page-layout orientation shows. ReadySetShow's interface is very much like its sibling's, which gives it power. Of course, if you don't like the interface of one, as some people don't, you won't like the other.

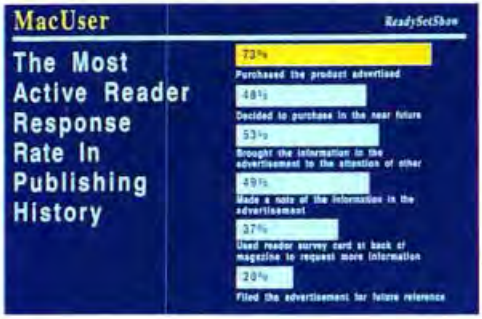
ReadySetShow has a good full-featured drawing environment that is almost the equal of Presents'. Its desktop-publishing background makes it especially useful when importing art from other programs, offering the ability to scale and crop images. It can even automatically run text around graphic images (although since the best slides are usually the simplest, this feature shouldn't get used that much).

ReadySetShow also has an integrated charting feature similar to that of Presents. The charting abilities include exploding pie charts and the use of pictures in bar and column charts.

The text-handling capabilities of ReadySetShow are the best of the lot. You can import text from a variety of word processors, and the text-handling features are those of a powerful desktop-publishing program.

ReadySetShow is also the only program of the group that allows slides to be exported as PICT files. This can be valuable if you have a slide recorder that lacks a Chooser driver. Most of the slides that accompany this article were prepared from PICT files exported from ReadySetShow (see "Point and Click Shooting Slides off the Mac").

The major drawback of ReadySetShow is its complexity. Because of the array of features it offers, it can be difficult to learn. It also lacks strong examples to work from, so nonartists will have difficulty creating attractive and effective slides. And there's no professional slide-preparation service allied with Letraset, which makes producing 35-millimeter slides more difficult and perhaps more expensive.



A simple column chart prepared with ReadySetShow's charting ability. The chart was originally supposed to be a line graph, and the legend should be farther left, but sometimes faster and easier wins over better design.

Point and Click: Shooting Slides off the Mac

One of the pieces of hardware that is fueling the desktop-presentation explosion is the film recorder. A film recorder is essentially a 35-millimeter camera mounted in a box and aimed at an imaging system. Film recorders have been around for years, and there are even cheap substitutes like specially designed hoods for taking pictures directly from a monitor screen. But recently, a number of less-expensive film recorders have appeared.

One of these new, low-cost film recorders is the Montage FR1 from Presentation Technologies. At press time, the Montage Expression driver, a Chooser-level driver being written by Cricket for use with the FR1, wasn't finished, so the slides had to be prepared from PICT files using imaging software from Presentation Technologies.

Preparing PICT files was no problem from ReadySetShow, and the screen shots were prepared using the ColorDump][FKEY and the program Grayview. PowerPoint, however, exports only to Scrapbook files, and Presents offers no export capability at all. Fortunately, the ImageQ desk accessory used to set up the Montage FR1 accepts pictures from the Clipboard, so the slides from PowerPoint and Presents were pasted into ImageQ. Presents posed an additional problem because choosing Select All from the Edit menu does not select the background (master slide) layer. As a result, the background had to be copied and pasted into each slide (and then sent to back).

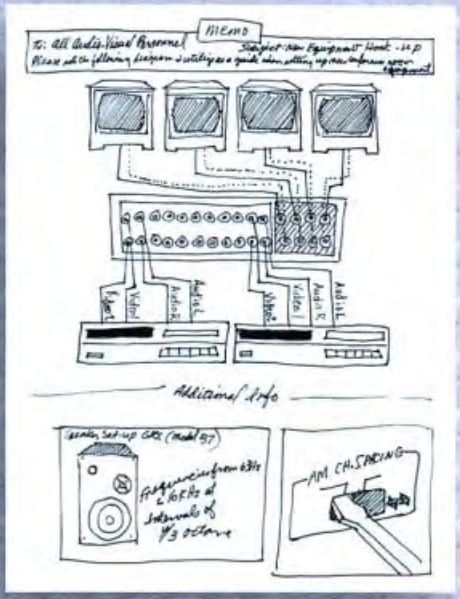
The Montage FR1 was easy to install and use, and it produced some excellent slides that you can see for yourself, as all the slides and screen shots accompanying this article were output on the FR1. The only major shortcoming of the FR1 is that it includes only two high-resolution fonts, Triumvirate (a sans serif, Helvetica-like font) and Times; the Expression driver is supposed to add support for the standard LaserWriter II fonts. If you'll be producing a large number of slides, you should definitely look into getting a film recorder.

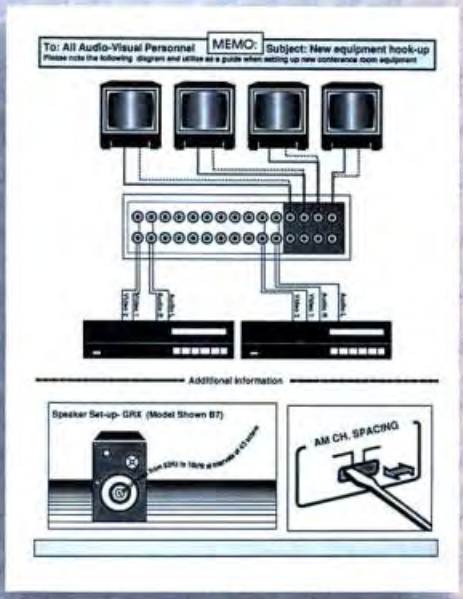
PRESENTING . . . THE WINNER AND NEW CHAMPION

After reading the list of features and quirks of each of these three presentation packages, you've probably already come to the conclusion that there is no clear winner. This three-way race is almost a photo finish, and the five-way race including MORE II and Persuasion is likely to be equally close. Here is one opinion of the order of finish:

1. PowerPoint — A surprise winner. Looking at the features chart, handicappers might have picked PowerPoint to trail the field. The edge on the track was due to the influence of Mi-

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crosoft's partner in slides, Genigraphics. The wealth of examples and the carefully coordinated color schemes provided by Genigraphics make PowerPoint the best choice for making striking and useful slides with a minimum of effort, especially for non-artists.

2. Presents — A strong finisher. The powerful drawing environment is offset by the less sophisticated text handling. The template library facility is excellent, but the templates provided lack the pizzazz of the Genigraphics examples. If you prefer the Cricket-style interface, if the lack of export capabilities isn't important to you, or if you need the better drawing environment, then you might want to choose Presents over PowerPoint. Experienced slide preparers and artists, who don't require the help of Genigraphics, will prefer Presents.

3. ReadySetShow — A contender. The features chart makes ReadySetShow look like the clear winner, but its dearth of strong example templates and its lack of a professional slide-preparation service partner slow it down. Its power is also a drawback, as it is the most difficult of the three to learn (unless you already know Ready,Set,Go!). Desktop publishers (particularly Ready,Set,Go! users)and artists might prefer ReadySetShow to the other programs.

Depending on your background and needs, the order of finish can be quite different for you. All three of these products are good, and all three should find a market. Based on looks at prerelease versions of MORE II and Persuasion, both of them will be right in the race as well, and MORE II has a good chance to be the overall winner. The really good news is that with all this excellent competition, all five products are likely to be made even better in future versions. Whichever one you choose, you'll end up with a winner.

ROBERT R. WIGGINS IS MACUSER'S CONTRIBUTING BUSINESS EDITOR AND HAS MADE COUNTLESS SLIDE AND OVERHEAD PRESENTATIONS OVER THE YEARS.

MACUSER RATING

PowerPoint ★★★★½

Follows Mac Interface	■■■■■
Printed Documentation	■■■■■
On-Screen Help	■■■■□
Performance	■■■■□
Support	■■■■□
Consumer Value	■■■■■

Comments: Easy-to-use tool that makes very attractive presentations. **Best Feature:** Genigraphics' predefined color schemes. **Worst Feature:** Lack of alignment and grouping of objects. **List Price:** $395. Published by Microsoft, 16011 Northeast 36th Way, P.O. Box 97017, Redmond, WA 98073-9717; (206) 882-8080. Requires System 4.1 or later, 1 megabyte and two 800K drives or hard disk. Not copy-protected.

MACUSER RATING

ReadySetShow ★★★★

Follows Mac Interface	■■■■□
Printed Documentation	■■■■□
On-Screen Help	None
Performance	■■■■□
Support	■■■■□
Consumer Value	■■■■□

Comments: Presentation program built like a publishing program, with strong text and graphics support. **Best Feature:** Automatic text flow around graphic objects. **Worst Feature:** Lack of good graphics examples makes it difficult for non-artists to prepare attractive slides. **List Price:** $395. Published by Letraset Corporation, 40 Eisenhower Drive, Paramus, NJ 07652; (201) 845-6100. Requires 1 megabyte and two 800K drives or hard disk. Not copy-protected.

MACUSER RATING

Cricket Presents ★★★★

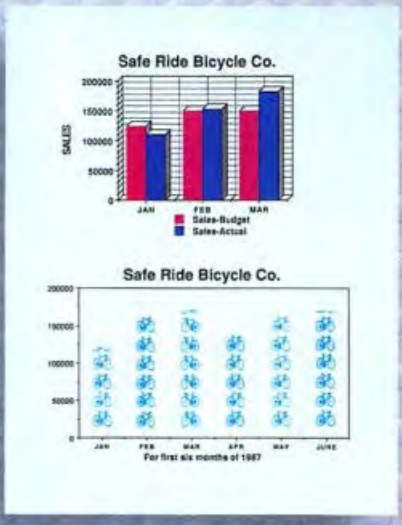
Follows Mac Interface	■■■■□
Printed Documentation	■■■■□
On-Screen Help	None
Performance	■■■■□
Support	■■■■□
Consumer Value	■■■■□

Comments: Powerful presentation tool with a strong emphasis on graphics. **Best Feature:** Template capability makes mixing and matching graphics elements easy. **Worst Feature:** No import capability for text, no export capabilities for text or graphics. **List Price:** $695. Published by Cricket Software, 40 Valley Stream Parkway, Great Valley Corporate Center, Malvern, PA 19355; (215) 251-9890. Requires Apple System 4.2 or later. Not copy-protected.

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COMPILED BY GREGORY WASSON

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Every month we'll select one tip as the Tip of the Month. The person who sends in that tip will receive $100 for it.

MACGOLF 3.0

If you have Pyro! on your hard disk and accidently move the cursor to the sleep corner of the screen while playing MacGolf, the screen will black out as usual, but when it comes back on, you'll be faced with a blank screen except for the menu bar.

There is a way, however, to restore the various windows of the game without resetting and starting all over from scratch.

To restore the Map window on the right side of the screen, first pull down the Options menu and select one of the five View Enlargements that wasn't selected prior to the blackout.

To restore the Golfer in the main window, pull down the Club menu and select a new golf club.

Finally, to restore the background scenery, click the Turn Left or Turn Right button and then the View button.

You're all set — just yell "Fore!"

RALPH NARUSAKI
HONOLULU, HI

CRYSTAL QUEST

Do you want to pick up that 10 million-point Crystal Quest 2.0 gauntlet thrown down in the August '88 issue of *MacUser*? Here are a couple of simple techniques that let you accumulate those precious extra lives at will.

Do not exit after clearing the screen on wave 5. Instead, kill the Dumples and their reinforcements. You'll face at most five Dumples at a time — easy fare. On this wave a new life requires 15,000 points: That's two new lives for every 15 Dumples.

A faster, although riskier, opportunity comes at wave 21. Accumulate points by killing Shrapwardens. Extra lives here require 40,000 points. Just average four Shrapwardens per life lost and you play indefinitely. A lower average will slowly eat into your stockpile of lives, but will send your score through the roof nevertheless.

CRAIG HANSEN
AUSTIN, TX

WORD

In the August '88 issue of *MacUser*, Charles Balch suggested a method for accenting a paragraph with a background screen in Word. The following sequence of PostScript commands produces the same result and is considerably shorter:

```
.para.  gsave  .97
setgray wp$box fill
grestore
```

As with the earlier tip, the gray intensity is set to .97 (where 1 represents white and 0 black). The space above and below the paragraph (as set in the Paragraph menu) is included in the shaded region and this background screen resizes itself if the paragraph is edited. [*We've received several complaints from readers who could not get the August tip to work correctly. It works fine here in the office. In any case, try this one out — it's a lot slicker. — Ed.*]

DILIP V. SARWATE
URBANA, IL

The Underline style in Word results in an underline that clings too closely to the word — the line slices right through any descenders. Sometimes the word and underline begin to resemble black scrambled threads rather than emphasized text. Here's how to unscramble this mess, using Word's formula mode.

Select Show ¶ from the Edit menu. Press Command-Option-\ to enter formula mode. Type an O to select the overstrike command, an opening parenthesis, the words to be underlined, a comma, a number of spaces equivalent to the length of your text, and then a closing parenthesis. It should now look like this on screen:

\O (peppery pungency,.....)

Now select all the spaces following the comma and choose Character from the Format menu. Click Underline and Subscript. Type in the number of points you want the underline subscripted. You'll have to experiment, since the ideal

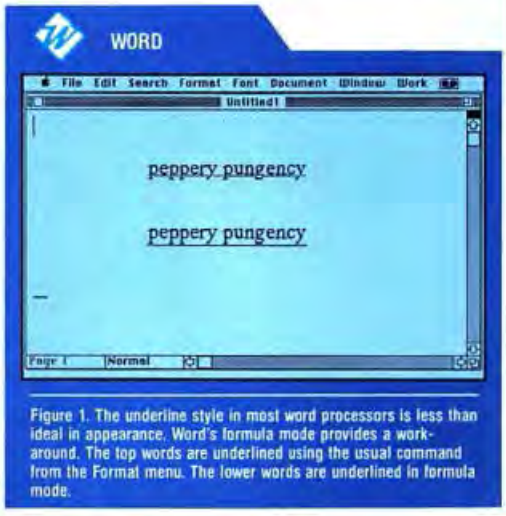


Figure 1. The underline style in most word processors is less than ideal in appearance. Word's formula mode provides a workaround. The top words are underlined using the usual command from the Format menu. The lower words are underlined in formula mode.



Tom Tjelmeland
President
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*Sheldon Needle survey, 1988

MU-1288

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amount differs from font to font and depends on the point size of the text. Click OK and select Hide ¶ from the Edit menu. The formula coding will vanish and your underlined word or words will appear. See Figure 1 for examples.

The subscripting might change the leading (line spacing) of the line with the underlined text. To avoid this, enter a specific number for line spacing in the Paragraph dialog box rather than the usual Auto. If the problem persists, insert a minus sign in front of the line-spacing number. This forces Word to keep the leading at the indicated amount no matter what.

You should save a sample like this to Word's glossary. Then when you want to use this alternative to the inferior underline style on the Format menu, just insert it and substitute new text and the appropriate number of spaces.

VINCE SWANSON
BELMONT, CA

How do you put a box within a box in Word 3.0X? The program's formula mode rides to the rescue once again.

Ordinarily you box a paragraph or group of selected paragraphs by selecting Box from the Border selections in the Paragraph dialog box. Box choices are Single, Thick, Double, or Shadow.

To do a box within a boxed group of paragraphs, first turn Show ¶ on. Press Command-Option-\ and then an X. Type the text to be boxed with parentheses after the X. Then Hide ¶, and an inner box will appear. The nested box is limited to a single line of text, and any return, including soft returns, will cancel the box formula command.

You can use this feature to create boxed labels within a boxed table. The boxed text can be bold or italicized — any variation normally available from the Format menu or the Character dialog box.

VINCE SWANSON
BELMONT, CA

MacUser's 1001 Hints & Tips for the Macintosh includes an unnecessarily complex technique for obtaining an estimated word count for a document. Here's an insanely easy way to do the same thing in the majority of cases:

Make sure the insertion point is at the top of the document. Access Change from the Search menu. Type in ^32 in the Find What box, and ^32 in the Change to box. Or simply press the space bar in each box. Click Change All. In a few moments the number of changes made appears in the lower left of the window. This yields a good approximation of the number of words in the document. And since you are changing white spaces into white spaces, you are, in effect, not making any changes at all. You run no risk of harming all your work. The only problem arises with long files: If you are short on memory, Word may not be able to complete the procedure. Also, if your words are separated by tabs or returns (as in a long list of words), this technique won't work well.

JIM A. MOWREADER
APO, NY

TIP OF THE MONTH

READY,SET,GO! 4.0

Ready,Set,Go! 4.0 has no way to generate a table of contents (TOC) automatically. Here's a fairly simple way to create a TOC that will stay current even as you change the document.

Create a text block on the page where you want the table of contents. Be sure that the block is only large enough to hold the one entry and the page number. Enter the text for the entry and then press Command-Option-Shift-7 where you want the page number to go. The symbol "&&" will appear, which is RSG!'s way of saying "text continues on" — something mentioned only on page 201 of the "Reference Shortcuts" documentation. Create similar blocks for each TOC entry.

Now use the linking tool to link each TOC entry to the target page text block. The TOC entry should now show the page number of the article or chapter. And it will be updated even should you add or delete pages.

This technique requires that you carefully preplan your document and create approximate text blocks for each item to be included in the table of contents. But it will still save you time and a lot of headaches.

JOHN BUONO
SIERRA VISTA, AZ

MACROMAKER

Ordinarily, the help screens for MacroMaker 1.0 are not available when you have the MacroMaker "recorder" showing. To view the help screens, you have to close the recorder, choose About MacroMaker from the menu, and then click Menu, Player, or Lists. There is, however, an undocumented way to move from the recorder screen straight to the help buttons: Just click on the version number in the lower-right corner (see Figure 2). When you're done looking at the help screens, click Cancel in the About box, and you'll return to the recorder.

B. VALISSIMO
ROCKFORD, IL

Assigning macros to Function keys with MacroMaker is handy because it doesn't take away any regular keystroke. But if you don't have an extended keyboard with Function keys, you can still use the Clear key on the numeric keypad as one — especially in Word. Ordinarily, the Clear key in Word acts as a toggle for the NumLock function. You can still use this function by

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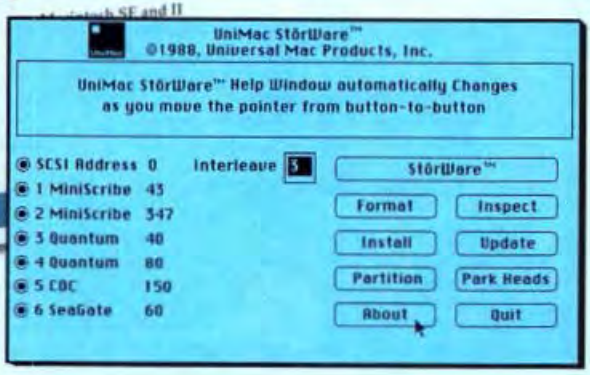
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MACROMAKER



Figure 2. MacroMaker's help screens are not available ordinarily when the program's "recorder" is showing. It's not documented, but by clicking as indicated you can indeed access the help screens.

pressing Shift-Clear even after assigning a macro to Clear.

BRUCE BABKINS
TORONTO, ONTARIO

MACPAINT

Printing from MacPaint to a LaserWriter is incredibly slow with the new version (2.0). I've found I can save quite a bit of time by copying the entire screen to the Clipboard, quitting MacPaint, opening Word (or if you're using MultiFinder, switching to Word), pasting the picture into a new document, and printing it from there.

ALBERT MAGNORI
MILWAUKEE, WI

MACGENIE

Subscribers to GEnie should know that they no longer have to put up with the non-Mac, awkward way that telecommunications services usually operate. In Library 7 there's a file (#9778) called MACGENIE.SIT, which is a "stuffed" file containing a program called macGEnie. This telecommunications program lets you move around in GEnie, upload and download files, and participate in bulletin boards using *icons* instead of time-consuming menus or arcane commands (see Figure 3). Be sure you switch to GEnie's "icon mode" when you're using macGEnie by entering TYPE 8 at any GEnie prompt. The current version is 0.08, and — unlike its CompuServe cousin, Desktop Express — it's free!

H. O'SHAUNESSY
PRAIRIE DU CHIEN, WI

RED RYDER

In the commercial versions of Red Ryder (10.0 and later), Scott Watson chose not to document a nifty feature that was sketchily documented in the 9.0 Read-me file. This features concerns how to include your own icon in your own menu. You do this in conjunction with the ADD TO MENU procedure command. To do this, you use a caret (^) character after the command, followed by a number. There are two steps involved:

1. Create an icon in a copy of the Red Ryder application using ResEdit. The icon should be an ICON resource and should have an ID number 265 or higher. Close ResEdit and save your changes.

2. Include a line like this in your procedure file:

```
ADD TO MENU ^9GEnie
log-on(S
```

See Figure 5 for an entire procedure file. Refer to the Red Ryder manual for information on how to create

MACGENIE



Figure 3. CompuServe has its Desktop Express, and now GEnie has its MacGEnie, a free public domain program that brings the Mac user-friendly interface to subscribers of GEnie.

RED RYDER



Figure 4. Customized menus with user-created icons can be created in Red Ryder — a feature not mentioned in the documentation of the commercial version. Here an icon is forged in ResEdit and added to Red Ryder.



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Figure 5. A sample procedure file in Red Ryder showing how the icon is added.



Figure 6. Hello there! Your icon greets you when the menu is pulled down.

a menu and how to use the ADD TO MENU command.

In this example, ^9 stands for the icon with ID number 265. Menu icons are numbered starting with 257, which means ^1 refers to the icon with ID number 257, ^2 refers to 258. Things get even weirder when you get past ^9. You can't enter ^10 because there must be a single digit after the caret. Instead, you have to follow the ASCII character set, where the colon (:) follows the character 9. So if you create an icon with ID number 266, you would enter ^: to refer to it.

That's it! Now when you run your procedure, Red Ryder inserts the icon you created to the left of the menu item (see Figure 6).

DAVE VALIULIS
SCOTTS VALLEY, CA

EXCEL

Some of the new features in Microsoft Excel 1.5 make it easy to customize, even though there is no Preferences command. I, for example, have a macro sheet that contains all my most commonly used macros. I keep this macro sheet on the top level of my directory and put the actual Excel program in a folder. When I want to start Excel, I simply open this macro sheet. It contains an auto-exec macro that performs the customization I require upon startup. This way, the blank worksheet waiting for me is in my favorite font, Palatino 12 point, and the pages will print without grid lines or column heads and with a date stamp instead of a page number. Also, the grid lines are turned off on the display. In addition, a few of my common macros are entered into a couple of custom menus labeled A and B.

By starting a session this way — via the macro sheet and not by double-clicking the application icon — not only do I have a customized startup, but I always have my most common macros available to me.

LELAND MCARTHY
REDWOOD CITY, CA

HYPERCARD

A simple addition to the script of the Sort button in the Address stack will allow names followed by academic degrees or "Jr." or "Sr." to sort correctly by last name when using the "Last Name" option on the button. As written, this option causes cards containing the mentioned titles to sort by the title rather than the surname. HyperCard recognizes groups of words separated by a comma as an item. Correct usage calls for a comma after the last name and before the added title. Therefore adding the phrase "of first item" into the script as indicated in



Figure 7. The address stack that accompanies HyperCard does not sort by last names correctly when they include titles like "Jr.," "Sr.," or "Ph.D." By adding the highlighted words to the script of button ID 39, this problem can be avoided.

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Font size range	4-127 pts.	7-24 pts.	7-72 pts.	2-127 pts.
Maximum recommended document size (in pages)	Over 2,000	240	50	500
Number of open documents	Unlimited *	1	30	30
Mail merge	**Yes**	No	No	Yes
Number of editable, on-screen columns (WYSIWYG)	4	1	1	1
On-screen auto-numbering footnotes	Yes	No	No	No
Automatic repagination	Yes	Yes	No	No
Graphics in same line as text	Yes	No	Yes	Yes
Multiple headers and footers	Yes	No	No	Yes
Extensive Undo	Yes	No	No	No
Variable line spacing (in points)	Yes	No	No	Yes
Selective font, size, style, and ruler changes	Yes	No	No	Yes
MacUser Magazine's Best New Word Processor	**Yes**	No	No	No
Search for a word	2.4 *sec*	7.6 *sec*	9.5 *sec*	9.7 *sec*
Spell Check document	6.3 *sec*	2 *min* 34.0 *sec*	2 *min* 2.3 *sec*	1 *min* 48.0 *sec*
Copy & Paste large area	6.8 *sec*	1 *min* 0.9 *sec*	12.4 *sec*	12.3 *sec*
Change font size of document	10.7 *sec*	50.2 *sec*	17.6 *sec*	16.2 *sec*
Change font of document	10.8 *sec*	37.1 *sec*	14.1 *sec*	15.2 *sec*
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All timing tests performed by an independent testing organization on a 12-page document using a Macintosh SE and a 20 megabyte hard disk.
* **Number determined by Macintosh system constraints.**

Demo version of WriteNow included on all Jasmine hard drives.

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Figure 7 results in a correct sort for names either with or without a title.

ROBERT BRUCE SHEAVLY
MUNICH, WEST GERMANY

GENERAL

Setting the insertion point and selecting individual letters can be difficult and inexact when working with italics — partly because the insertion point is vertical and italic letters are not and also because italic screen fonts are usually terrible. Here is a simple way to set the insertion point and select individual letters consistently — no more hit and miss:

1. Move the I-beam to the *center* of the letter *just in front* of the letter that you want to select.

2. Click. The insertion point will be set immediately in front of the desired letter.

That's it. Now you can be certain that any typing at this point will be placed where you want it. You can also easily drag from the insertion point to the right and always select the desired letter. Select the first letter of a line of italics by clicking well to the left of the line and dragging to the right until a selection "pops" up on the screen.

PHIL GAINES
BELLEVUE, WA

When you need to isolate an icon or dialog box in a screen shot to include in a document (see Figure 8A), it's a royal pain to trim off the background gray pattern (usually you have to resort to fat bits to get it exact). Here's a simple way to make editing screen shots easier. Use the Control Panel to change the desktop pattern to white (click on the upper-left arrow until the pattern shows completely white, as in Figure 8B, then click in the tiny window below the arrow to apply the change). Most applications actually use the desktop pattern as their own background pattern, so this change makes screen shots within applications easier too. Now when you take a screen shot (using Command-Shift-3), the screen item you need will be easy to select or lasso all by its lonesome (see Figure 8C).

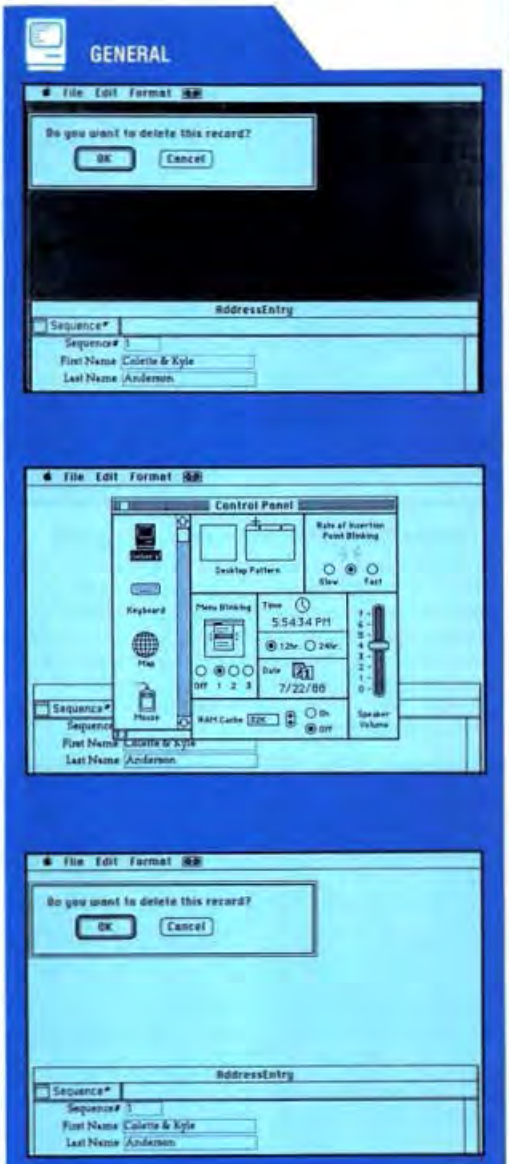
ALBERT M. MUEZZA
SCOTTS VALLEY, CA

CORRECTION

In *MacUser's 1001 Hints & Tips for the Macintosh*, there was an error in the Mac SE tip "Access the Hidden Slide Show" (page 7). Here's the corrected version.

To see a hidden four-frame slide show built into the SE's ROM that shows the members of the SE development team, boot the Mac and press the interrupt button on the programmer's switch. You should, before starting this procedure, make sure that all modems are turned off. In the debugger window, type G <space> 41D89A (the book incorrectly tells you to type G41D89A, with no space) and press Return. The slide show will continue until you reboot the machine.

ROLAND GUSTAFSSON
SAN MATEO, CA



Figures 8A, B, and C: Tidying up screen dumps for inclusion in documents can be messy. Clean up your act by learning the ins and outs of the Control Panel. A) shows the typical screen prior to the fateful Command-Shift-3. B) enlightens you to the necessary settings on the Control Panel. C) makes it all whiter than white.

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CARD TRICKS

3 Steps to Increase Your Vocabulary

by Michael Swaine

Arguably, the most important concept in the development of digital computer software is the idea of code as data and data as code. It's trivial: every time you edit a script in HyperCard's programming language, HyperTalk, you are treating code as data; whenever HyperCard executes what you type, it is treating data as code. It's fundamental: the whole edifice of artificial intelligence stands on this one idea. And it's deep: the interchangeability of code and data implies subtleties of language and metalanguage that have yet to be resolved.

This month's exploration is about code as data, data as code, artificial intelligence, everything that is in HyperTalk and something that isn't. We'll start with a natural-language script that generates random English sentences, gaining its generative power from treating data as code. Next we'll treat the vocabulary of HyperTalk itself as data, stuffing it into a field, where it could be used to write, say, a script editor or an on-line help system. Finally, we'll envision a useful code-as-data tool that should be a part of HyperTalk, but isn't — yet.

The term *artificial intelligence* is given its proper technical definition elsewhere in this issue. No matter: Tell your Uncle Bud that you're doing artificial intelligence programming on your Macintosh, and his response will most likely be, "So let's see you make it talk."

This is for Uncle Bud.

At the end of this column you'll find a script for a random sentence generator. It is capable of implementing many of the rules of English grammar and of producing perfectly correct, if not always profound, sentences according to those rules. (They may not be correct according to other, unimplemented rules.) Some examples of its output are:



JIM LUDTKE

Man is carnivorous.

Every man respects courage.

The waiting annoys the women.

The flea contemplates comedy and death.

Human beings know what all elephants like.

The animals respect it that man likes them.

You hate it that elephants hyperventilate.

We are angry yet you were elated because any man loves hamburgers.

Every human being annoys us.

If you have looked at the script, you should suspect me of some sleight of hand. It's much too short. The grammar of the English language is complex: to capture all its rules and special cases in HyperTalk would be a mammoth undertaking. As fat as *MacUser* has grown, I couldn't fit that script into this column, even if I were up to the programming task.

In fact, the script knows very little about English — only that a sentence begins with a capital letter, ends with a period, and consists of one or more strings of characters separated by spaces; and that none of these strings of characters begins with an asterisk. How then does it produce grammatical English sentences? Where is its knowledge of English grammar?

It's in the data. The script reads from fields, which contain both vocabulary (the data of language) and templates for grammatical structures (the combining rules, or program, of language). This template-grammar approach would not be adequate for a full specification of English grammar, which requires something like transformational rules, but it is remarkably powerful. It also saves me time and the magazine space by allowing you to expand both the vocabulary and the grammar just by adding to the fields.

Here's how the program works: It randomly picks a sentence form, like subject-verb-object, from a field containing sentence forms, one form per line. It examines in turn each "word" (string of characters not including a space) in the line. If the "word" does not begin with an asterisk, the script takes it to be a real word and tacks it onto the sentence it is building; if it does begin with an asterisk, the script treats it as a reference to a field. When the script encounters a field reference, it performs this same, simple process on that field: picks a line at random, and for every "word" in the line, either tacks the "word" onto the building sentence or treats it as a further field reference. In the fields are the words of the vocabulary, and in this referring to fields resides the grammar. When the last field reference resolves into one or more real words, the script capitalizes the first letter, appends a period, and displays the sentence.

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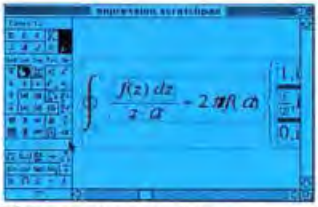
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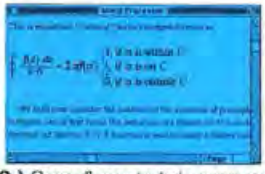


See Review in this issue's MiniFinders under word processing.

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CARD TRICKS

The script uses recursion, a technique discussed in this column in May. Recursion is a sort of software chain reaction. Interpretation of one "word" may require reference to several fields, which may in turn refer to other fields, ultimately generating very many real words. For example, the field reference *subject expands to a full subject of a sentence, possibly including adjectives and a compound noun phrase.

> An unpleasant side effect of recursion is that the script sometimes crashes with the error message "Too much recursion."

An unpleasant side effect of recursion is that the script sometimes crashes with the error message "Too much recursion" because HyperTalk does not adequately support recursive programming. Interestingly, in the case of this script, these crashes largely go away as you increase the size of the vocabulary. The problem is only serious if you have many rules in your grammar relative to the number of words in your vocabulary, so that highly complex sentences get generated with a high frequency. You can get the effect of a large vocabulary immediately by simply stuffing many copies of your words into the fields, and leaving only one copy of each line containing an asterisk; this will decrease the likelihood of the long, complex sentences. The human mind has just this sort of trouble with overly complex sentences.

To use this script, key it in as the script of a new stack. (You invoke the script by clicking the mouse anywhere outside any fields and buttons.) Create a background field named ShowSentence for output and one named *SentenceForm. Don't forget the asterisk. Put whatever sentence forms you want to start with into *SentenceForm, one per line. Mark the grammatical components and leave real words unmarked, like this:

```
*subject *verb *object
to *verb *object
they
arrive
*subject or *subject
```

Create a background field for each new grammatical component, and put one or more components in each, one per line, marking any grammatical component and creating and filling a field for it. Note that you are building both a vocabulary and a grammar at once: Words without asterisks are additions to the vocabulary, and any line containing at least one asterisk is a rule in your grammar. Make sure that you 1. create a field for every asterisk-marked term, and 2. provide enough real words. I recommend that you start with the sample data fields at the end of this column. The grammar that produced the sample output is from a larger grammar, consisting of these constructs:

```
*SentenceForm
*Subject
*SubjectSingular
*SubjectPlural
*Object
*PredNom
*PredNomSingular
*PredNomPlural
*Noun
*NounSingular
*NounPlural
*Pronoun
*PronounSingular
*PronounPlural
*Article
*ArticleSingular
*ArticlePlural
*Adjective
*VerbTrans
*VerbTransSingular
*VerbTransPlural
*VerbIntrans
*VerbIntransSingular
*VerbIntransPlural
*VerbCop
*VerbCopSingular
```

```
*VerbCopPlural
*Adverb
*Conjunction
*ConjunctionSimple
```

Of course, there is nothing in the script that requires you to generate *English* sentences. . . .

If putting the vocabulary and grammar of English into fields can get so much power out of so little code, what could you do if you had the vocabulary and rules of HyperTalk to play with? Write your own script editor? Write a pop-up HyperTalk glossary? Generate random programs? If you follow some simple instructions, you will end up with the entire vocabulary of HyperTalk, every word that it recognizes, in a scrolling field where you can do with it what you will.

The instructions, then. Invoke the utility ResEdit. Trace through its menu of file and folder icons until you find HyperCard. Double-click on the HyperCard icon to get the list of HyperCard's resource types. Scroll down to WTLK and double-click on it, and then on "WTLK ID = 4." You'll then see several columns of numbers and letters; in the right-hand column, you should recognize some words: do, else, end, exit. You want that column. Select it — the whole column. Press Command-C to copy it. Then paste it into a text file, either via an editor DA or by exiting from ResEdit and using a word processor (be sure to save it as a Text file).

Once you have the vocabulary captured to a text field, invoke HyperCard, create a new stack, create a button and a scrolling card field named *vocabulary*, and key in the importing script as the button's script. Click on the button, supply the name of the file, and watch HyperTalk pour into the field. You're on your own for the grammar.

The final script this month is the property toggle I owed you from last month. It's self-explanatory, but note the awkwardness of the reference to the toggle command. What I wanted to say was something like "toggle the visible of card field 1," but that doesn't work because HyperTalk evaluates its parameters before passing them to the handler. Fine, but I think I should also be able to pass uninterpreted parameters to a handler. This is another instance of code as data: If the parameters remain a mere string of characters until I decide how to interpret them, I have a flexibility that has proved important for AI programming. When John McCarthy invented artificial intelligence, he included that ability in LISP, the first AI language. A function that got its parameters uninterpreted was then called a special form, although that term means something else in the metalanguage of LISP today. I see no reason why we can't have the ability in HyperTalk today. Could you add that, please, Bill and Dan, and make recursion work while you're at it? Thanks.

> **What could you do if you had the vocabulary of HyperTalk to play with? Write your own script editor?**

```
-- Script 1: Random Sentence Generator
-- Released to the public domain
-- Mike Swaine September 1988
-- This is a card or stack script.
-- With an appropriate database of vocabulary
-- and grammar rules, it produces correct random
-- sentences in any natural or artificial language.

-- This first handler triggers sentence generation.
-- It responds to a click anywhere outside of any
```



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CARD TRICKS

```
-- button or field, and invokes the function
-- sentence to put a random sentence into the
-- background field "ShowSentence."


On mouseUp
     Put sentence() into field "ShowSentence"
End mouseUp

-- This function handler selects a sentence form
-- from the field *SentenceForm, calls the function
-- parse to interpret all the nonwords in the form,
-- and punctuates the result, which it returns.


Function sentence
   Global trace
   -- Select a sentence form at random.
   Put any line of field "*SentenceForm" ¬
   into theForm
   Put theForm && ":" & return into trace
   Put empty into theSentence
   -- Examine each "word" of the sentence form.
   Repeat with i=1 to the number of words of theForm
      Put word i of theForm into wordI
      -- If it begins with "*" then parse it.
      If character 1 of wordI = "*"
      Then put parse(wordI) into wordI
      -- Tack words onto the end of the growing
      -- sentence, separating them by spaces.
      Put wordI & " " after theSentence
   End repeat
   -- Capitalize the first letter of the sentence.
   If charToNum(character 1 of theSentence) ≥ 97
   Then put ¬
    numToChar(CharToNum(char 1 of theSentence)-32) ¬
   into character 1 of theSentence
   -- Put a period at the end of the sentence.
   Delete last character of theSentence
   Put "." after theSentence
   Return theSentence
End sentence


-- This function handler interprets a component
-- of a sentence, returning a sequence of real
-- words comprising one sentence component.
-- It calls itself recursively to interpret
-- subcomponents of components.


Function parse s
   Global trace
   Put s & "," after trace
   -- Select a random component of the desired type.
   -- Variable s is both the name of a sentence
   -- component, such as *subject, and the name of
   -- a field containing such components.
   Put any line of field s into s
   -- If the component selected is not simply a word
   -- or sequence of words, then interpret it.
   If "*" is in s
   Then
      Put empty into parsed
      -- Examine each word.
      Repeat with i=1 to the number of words of s
```


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```
        Put word i of s into wordI
        -- If  it begins with "*" then parse it.
        If character 1 of wordI = "*"
         Then put parse(wordI) into wordI
         -- Tack words onto the end of the growing
         -- sentence, separating them by spaces.
        Put wordI & " " after parsed
      End repeat
      If last character of parsed = " "
       Then delete last character of parsed
      Return parsed
    Else
     -- Return the parsed component.
      Put s & return after trace
      Return s
    End if
End parse
```

```
Sample data fields for Random Sentence Generator

Background field *SentenceForm:
      *subjectS  *verbTransS  *object
      *subjectP  *verbTransP  *object
      *subjectS  *verbCopS  *predNomS
      *subjectP  *verbCopP  *predNomP
      *subjectS  *verbIntransS
      *subjectP  *verbIntransP
      *sentenceForm  and  *sentenceForm
      *sentenceForm  because  *sentenceForm

Background field *SubjectS:
      he
      she
      it
      Arthur
      Alice
      *subjectS  or  *subjectS
      *subjectP  or  *subjectS

Background field *SubjectP:

         they
         dogs
         cats
         *subjectS  and  *subjectS

    Background field *Object:
         me
         you
         us
         him
         her
         it
         them
         *object  and  *object

    Background field *VerbTransS:
         likes
         hates
         understands
```


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CARD TRICKS

```
Background  field  *VerbTransP:
      like
      hate
      understand

Background  field  *VerbCopS:
      is
      was

Background  field  *VerbCopP:
      are
      were

Background  field  *VerbIntransS:
      bark
      remain

Background  field  *VerbIntransP:
      barks
      remains
```

```
--  Script 2:  HyperTalk Vocabulary Importer
--  Released to the public domain
--  Mike  Swaine  September  1988
--  A quick & dirty script to put the entire
--  HyperTalk vocabulary into a card field,
--  tidying it up in the process.
--  This script assumes that the vocabulary
--  has been pasted into a text file after
--  being copied verbatim from the WildTalk4
--  resource of the HyperCard application.
--  That's not all it assumes; it will need
--  to be modified for versions of HyperCard
--  before or after 1.2.

On  mouseUp

 --  Must be modified for Versions other than 1.2.
 If the version is not "1.2"
 Then
    Put "Works for Version 1.2 only."
    Exit mouseUp
 End if
 Put 1 into bfrPos
 Put empty into card field "vocabulary"
 --  If you have the fileName XFCN, use this:
 --    Put fileName("TEXT") into f
 --  Otherwise, use these two lines:
 Ask "What file?"
 Put it into f
 Open file f
 --  Read the file into variable bfr.
 --  My termination condition on reading is not
 --  good programming.  Better to put a distinctive
 --  character at the end of the file & read to it.
 Read from file f for 3792
 Put it into bfr
 Set the cursor to watch --  Watch & wait.
 --  Copy bfr into the field, tidying up as you go.
 Repeat with i=1 to the number of chars of bfr
    --  Skip all the asterisks and funny characters.
    If charToNum of char i of bfr = 42 ¬
```


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```
      or (charToNum(char i of bfr)<48 ¬
      and charToNum of char i-1 of bfr = 42)
      Then put i+1 into bfrPos
     Else
        -- When you get to the end of a word...
        If charToNum(char i of bfr)<48
       Then
          -- write it as a new line to the field.
          Put return into char i of bfr
          Put char bfrPos to i of bfr ¬
           after card field "vocabulary"
          Put i+1 into bfrPos
       End if
     End if
   End repeat
   -- Flush the buffer and beep.
   Put char bfrPos to (the number of chars of bfr) ¬
   of bfr after card field "vocabulary"
   Set the cursor to hand
   Close file f
   Beep
End mouseUp
```

```
-- Script 3: Property Toggles
-- Released to the public domain
-- Mike Swaine September 1988
-- See text of column for a discussion
-- of why I implemented toggle in this
-- cumbersome way and why it should be easier.

-- This button script opens/closes
-- a field for text input.


On mouseUp
   Toggle "the lockText of card field 1"
End mouseUp

-- This script toggles its object's visibility.

On mouseUp
   Toggle "the visible of me"
End mouseUp

-- This script, intended to be placed at the
-- level of the stack or Home stack in the
-- hierarchy, implements the toggle command.

On toggle
   Put the number of words of param(1) into L
   Put word 2 of param(1) into relevantProperty
   Put word 4 to L of param(1) into theObject
   If theObject is "me" then put "the target" ¬
   into theObject
   Put the name of theObject into theObject
   Do "set the" && relevantProperty && "of" && ¬
   theObject && "to not the" && ¬
   relevantProperty && "of" && theObject
End toggle
```


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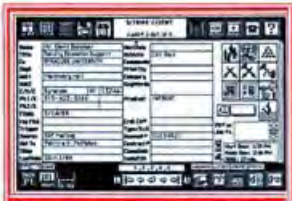
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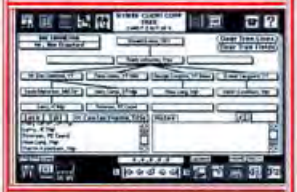
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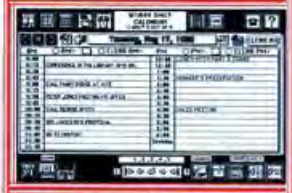
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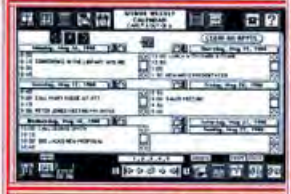
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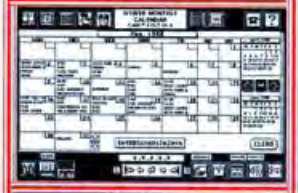














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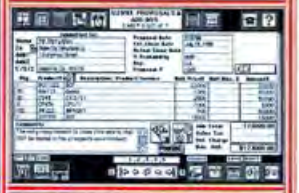














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FLASH CARDS

EDITED BY LAURA JOHNSON AND VICTORIA JUAREZ

Happy Birthday, Flash Cards! Since our premiere in December '87, we have shown you an intriguing variety of HyperCard stacks — some homegrown and some of the commercial variety. And, just when we think we've seen it all, a hot new item crops up.

HyperCard, in its infancy, has had a tremendous impact on business, education, entertainment, and science — more than 200,000 stacks so far, according to Apple CEO John Sculley (we haven't seen all of them but we're working at it). Many of these stacks are sophisticated and comprehensive, but some of the best and most entertaining are simple stacks from first-time HyperCard users. Many of our Flash Cards listings have graduated to Quick Clicks and feature reviews.

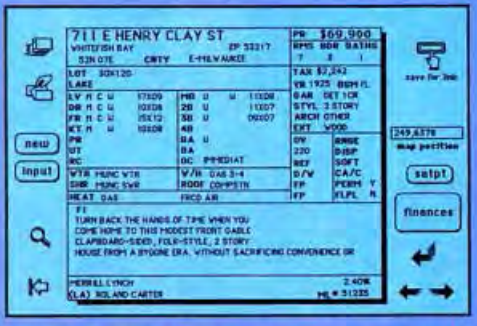
You can find the shareware and freeware stacks on bulletin boards and the commercial stacks at your local software emporium.

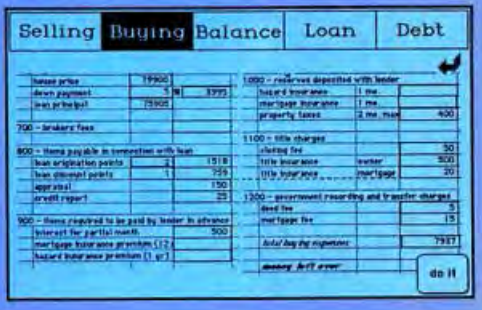
If you create a stack that you think others will be interested in, please send it to Flash Cards, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404. We can't promise to show your stack and we can't return your disk, but we might make you famous.

Where Is Home?





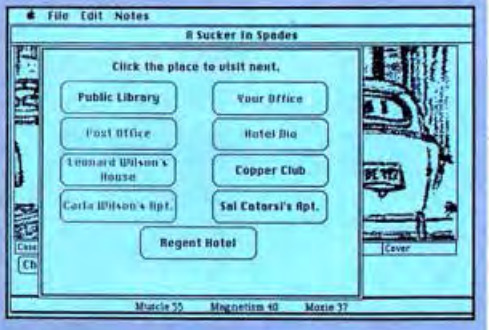


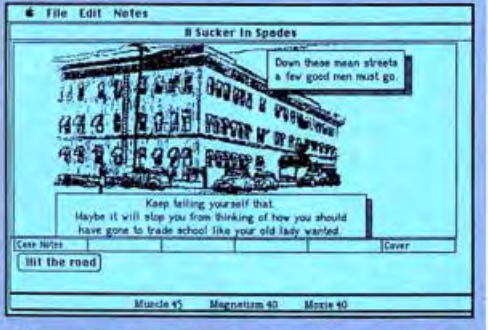


If you're interested in buying a home in the Whitefish Bay area of Milwaukee, consult MAP-link Milwaukee. These five stacks have maps of homes available with pertinent information (such as price, rooms and room sizes, lot size, and appliances); school and park locations; and home-finance data. MAP-link Milwaukee is available for $15 from VIA Graphics, which will develop MAP-link stacks for any area. Write to them at P.O. Box 17666, Milwaukee, WI 53217; (414) 961-1910.

Private Eye

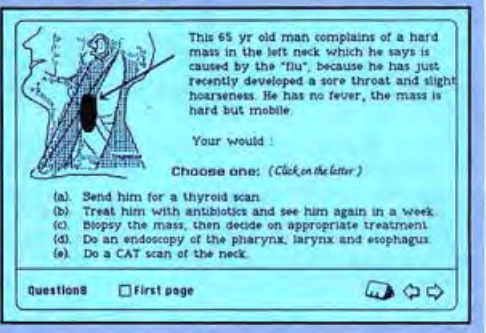


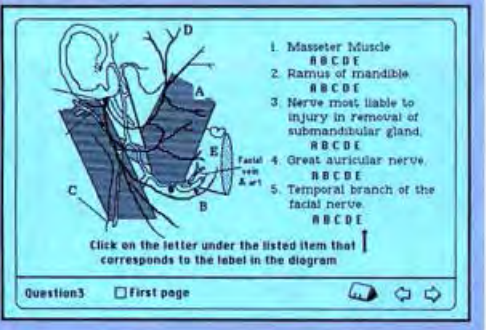


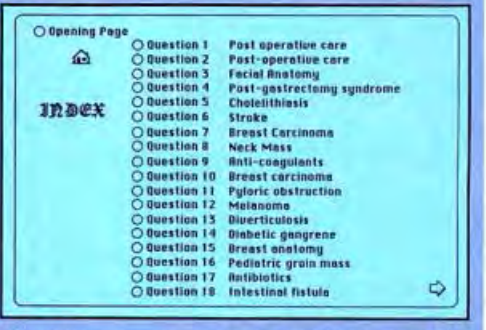


Use your moxie, muscle, and magnetism to pursue clues and solve the mystery. Pay particular attention to your paperwork as your performance is evaluated by The Boss. The better you present your case, the higher your score. A Sucker In Spades is a Hypertext stack from Eastgate Systems, Hypertext Publications, P.O. Box 1307, Cambridge, MA 02238; (617) 782-9044; $15.

Surgical Prep







MacSurgery presents commonly encountered surgical situations and a choice of procedures. These 50 multiple-choice questions with references may help postgraduate students prepare for board exams. Surgeons may find it useful to keep up with current surgical practices. From MacMedic Publications, 7530 Harwin, Houston, TX 77036; (713) 977-2655; $125.



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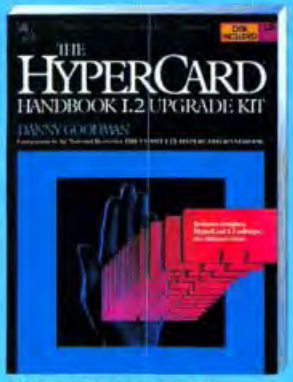
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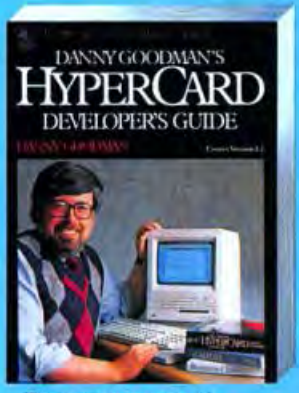
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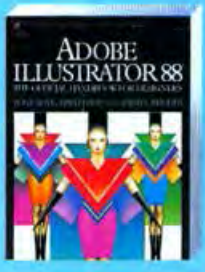


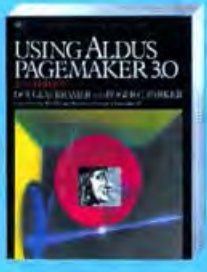
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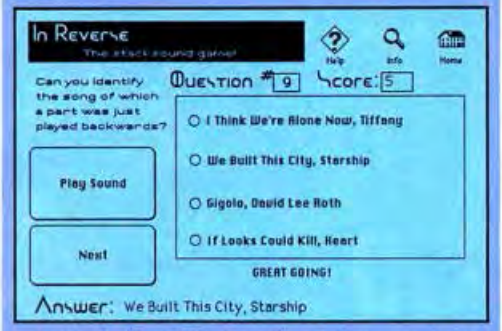
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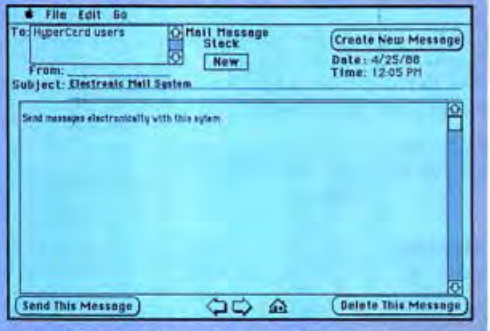
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Rewind



Annodam's "hcaerP t'noD apaP" and other excerpts from popular songs are played backward in this stacksound game. You get to listen and guess the titles of ten tunes. In Reverse is shareware by Benjamin Kuo, 3419 E. 7590 South, Salt Lake City, UT 84121; $10.

Return to Sender



HyperCard Mail is an electronic-mail system that requires HyperCard and an AppleShare server. At $79, it's an inexpensive way to send messages to a single user, multiple users, or the whole organization. From SSDS, 1101 W. Mineral Ave. Suite 200, Littleton, CO 80120; (303) 798-5520.

Tooling Up



Add versatility to HyperCard with these HyperTools add-in tools and utilities. HyperTools utilities simplify the development and modification of stacks. There are two volumes of 16 tools each, priced at $99.95 per volume. From Softworks, P.O. Box 2285, Huntington, CT 06484; (203) 926-1116.

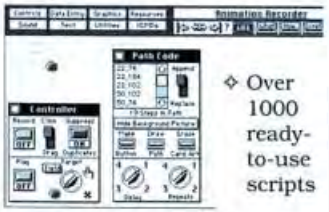
Historically Speaking



Dateline America is a time line of American history from 1492 to 1763. This large stack (more than 2100K) contains maps and animation. From Robert Huber, TimeScapes, 501-½ Claire St. Ashland, WI 54806; $24.95.

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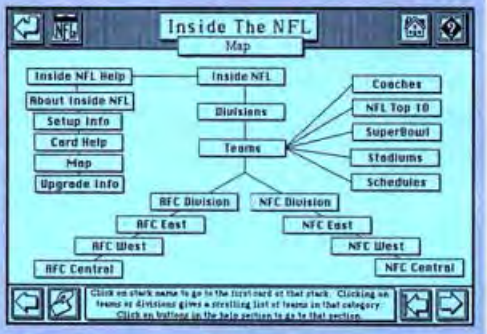
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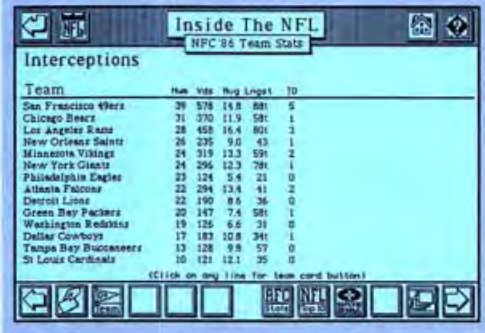
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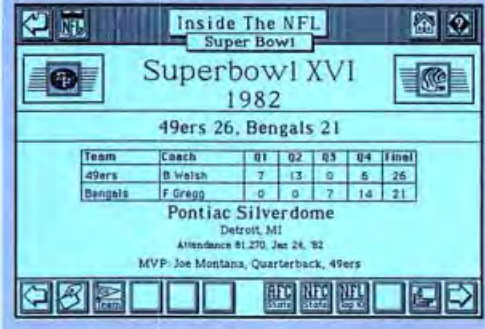
Gridiron

Inside the NFL has the inside track on all the NFL teams, players, coaches, and stadiums. Review individual player records, statistics, achievements, and personal information; learn who the NFL top ten performers for the season were in categories such as interceptors, receivers, and punters; look up team schedules or Super Bowl data. Inside the NFL is available from I-Track Corporation for $69.95. Yearly upgrades will cost $15. You can write to them at 710 E. Park Blvd., Suite 204, Plano, TX 75074; (800) 843-3879; in Texas (214) 422-4759.





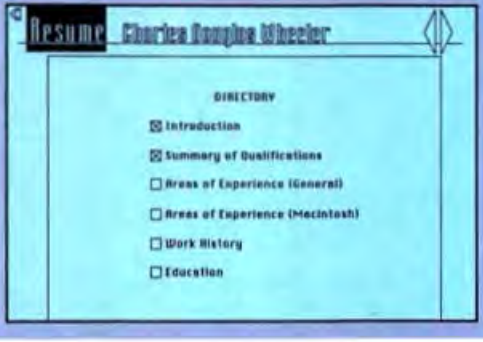




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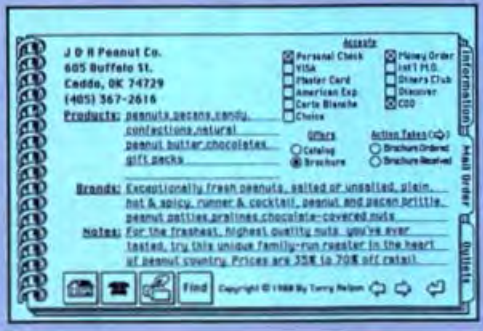
This resume has the familiar entries for qualifications, realms of experience, work history, and education. Click on an icon on the Areas of Experience Card for Wheeler's proficiency in each application and some examples of his work. Resume is by Charles (you guessed it) Wheeler, 12044 Seventh Ave., NW, Seattle, WA 98177; (206) 365-3601.

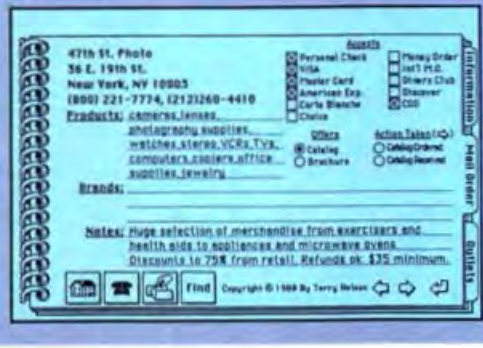




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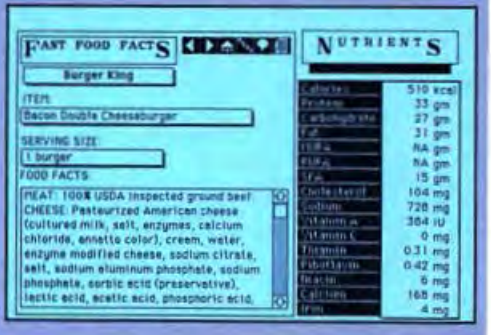
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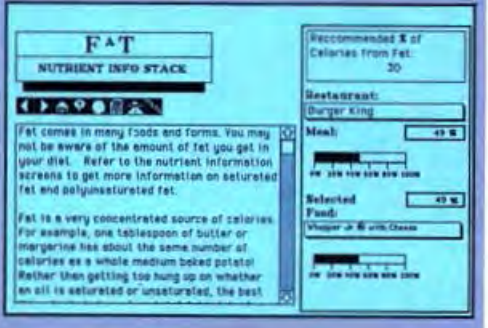
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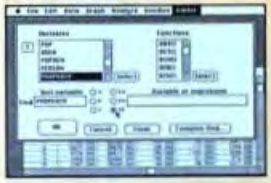
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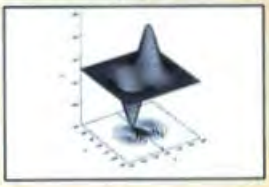
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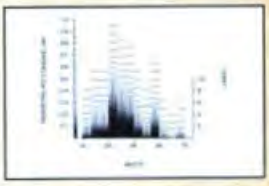
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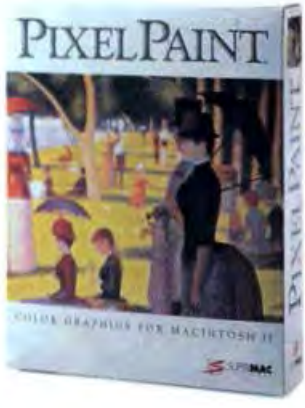
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HYPER SPACE

Welcome to Hyperspace, the source for the latest in HyperCard stacks, scripts, and development tools. If it has to do with HyperCard, you'll find it here. Like HyperCard itself, Hyperspace works on all user levels. Browsers will want to turn to Flash Cards to see what's new in public domain and commercial stackware. Anyone who has set the user level to scripting should check out Card Tricks by Michael Swaine. For those in-between, we have plenty of news and reviews on the latest in things HyperCard. If you want to learn more about this revolutionary new environment, join us as we warp into Hyperspace.

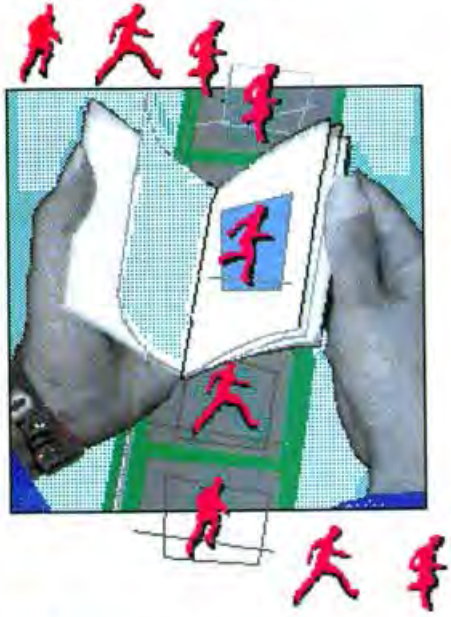
VideoWorks II HyperCard Driver and Accelerator Driver

Two of the areas for which Apple's HyperCard seems best suited — education and simulation — share a need that the program does not meet: animation. There is something about motion, particularly in our TV-immersed age, that attracts, educates, and illustrates better than the static image of the printed page or of most computer displays.

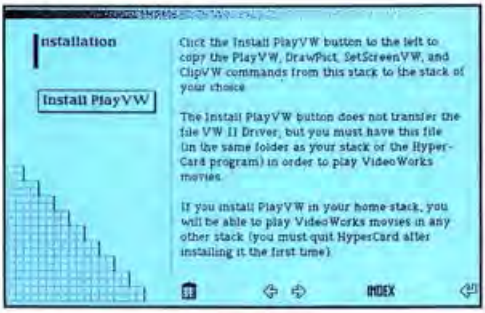
It is possible to create relatively simple animation in HyperCard. You can use a card-flipping approach, something like the old Cracker Jack box days of "flip art." But the motion tends not to be very smooth and the number of cards required to do realistic animation can be staggeringly large. You can also create objects on a card and use HyperTalk programming techniques to move them relatively smoothly across the display. But this approach is limited to objects that can be animated without changing shape.

To get around these limitations, MacroMind came up with the VideoWorks II HyperCard Driver. This program is really a series of external commands that extend the HyperTalk programming language to display VideoWorks II "movies" in a nicely integrated way with HyperCard stacks. As an answer to the need for HyperCard animation, it comes as near to perfection as any software I've seen. Installation and use are literally child's play. You can have a movie triggered by any action in HyperCard: a button-click, card change, field opening, or any other event that can be associated with a HyperTalk script. You can exercise complete control over where the movie displays, how it affects the underlying card image, when it stops, and what happens when it stops.

You can also incorporate color movies atop a monochrome HyperCard display, and thus simulate a color version of HyperCard while we wait for Apple to create a truly colorful HyperCard product. The Hyper-



MARK W. SWEENEY



The manual for the VideoWorks II HyperCard Driver comes as a stack. An installation button allows you to customize a stack with the driver. Installing it on your Home Card lets you play movies from any stack.

Card-based manual that comes with the VideoWorks II HyperCard Driver is a fine example of a well-designed, interesting, and useful stack. It is clear that the people who developed it understand HyperCard and how people use this emerging medium to become acquainted with new products. Most cards have a button that demonstrates the subject of the card. Every one of them worked flawlessly. The explanations for the commands, while sometimes a little too terse, are certainly usable. With only about 30 minutes of exploration, I was able to bring up animation on a HyperCard stack, using a card for a backdrop, and interact with the animation from within the stack's scripts. I'm impressed.

In fact, there are really only two problems with this software, both relatively minor. First, memory use. This is not, of course, limited to VideoWorks II; any application that coexists with HyperCard is going to be up against memory limits. If you run the VideoWorks II HyperCard Driver, you will be using up close to 800K. Allowing for system overhead, on a 1-megabyte machine you cannot show a movie longer than about 125K without running into problems. It turns out you can do a great deal of interesting animation within these limits, so the boundary is not a major obstacle to high-quality animation in your stacks. The second problem is that the program seems to have trouble on occasion finding the pieces it needs to run, even though they are clearly there. I encountered a number of aggravating error messages about needing files in certain places when I could see that the items were where the program appeared to be looking.

Other than these two minor points, VideoWorks II HyperCard Driver is a first-rate, well-executed, and useful program that demonstrates what such add-in HyperCard tools ought to be.

In conjunction with the VideoWorks II HyperCard Driver, I also took a look at the VideoWorks II Accelerator. This product's purpose is to eliminate the ragged look some animation created with VideoWorks II can have because of the way the screen display works. VideoWorks II Accelerator is a separate, stand-alone application that compilesVideoWorks II movies into a special format. This new format takes into account how the display works, and compensates so that your movie images move much more smoothly across the screen.

One of the things you sacrifice if you use these accelerated movie files is the ability to play them directly on top of a HyperCard card, as you can with the unaccelerated versions. This limits somewhat your use of these movies in HyperCard, but you can show accelerated movies from within HyperCard with another set of external commands supplied with the program by MacroMind. If it is important that your card act as a backdrop for the animation, you must capture an image of the card and use it in the creation of the movie itself.

You must, of course, own VideoWorks II to create movies, though you can play movies created by others without owning the whole package. You need only a driver. Licensing for VideoWorks II drivers ranges from $1 per disk to $3.75 per disk for black-and-white movies, and from $1.75 to $6.25 per disk for color movies.

At the low-volume end, this pricing seems somewhat high to me, and it may serve to discourage the early adoption of this animation technique by the underfunded educators and developers who might make best use of the medium.

— Dan Shafer

VideoWorks II HyperCard Driver
★★★★½



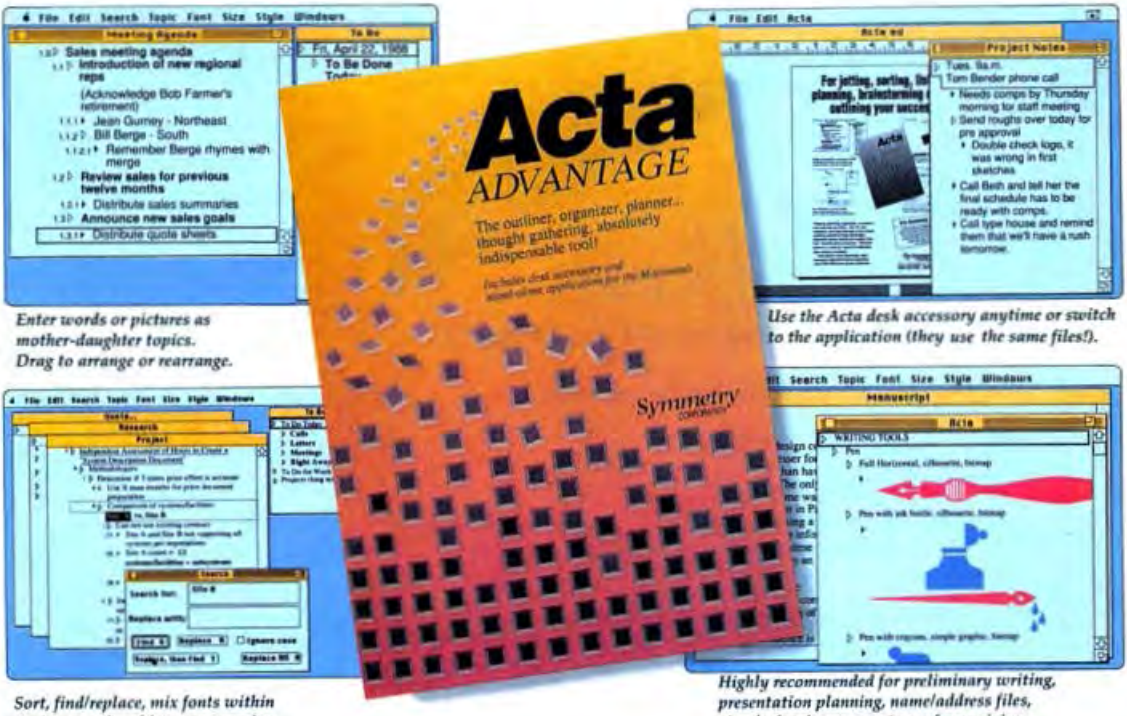
List Price: $99.95
Published by: MacroMind, 1028 West Wolfram, Chicago, IL 60657; (312) 871-0987.
Version: 1.0
Requires: 1 megabyte, VideoWorks II, and HyperCard; hard disk recommended.
Compatibility: Mac II and MultiFinder friendly.
Application Size: 44K
Copy Protection: None

VideoWorks II Accelerator
★★★★



List Price: $195
Published by: MacroMind, 1028 West Wolfram, Chicago, IL 60657; (312) 871-0978.
Version: 1.0
Requires: 1 megabyte, VideoWorks II; hard disk recommended.
Compatibility: Mac II and MultiFinder friendly.
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BMUG

Stackware takes a big slice of the CD-ROM pie in the Berkeley Macintosh Users Group (BMUG) PD-ROM disc of shareware and freeware. The optical disc holds over 300 megabytes of public domain programs including clip art, utilities, games, and of course HyperCard stacks.

All of the hyper stuff is arranged in folders by categories. Among the notables are: Hyper Business (scheduling, inventory, personal checking), Hyper Education (Japanese drills, guitar chord lessons, astronomy), Hyper Graphics (desktop music videos, clip art and icons by the score), Hyper Sound (from cartoons, television, and movies), and Hyper Media (indices to Macintosh magazines including, of course, *MacUser*). The disc also has HyperCard 1.2.1 with a custom Home card that could only have come from the radical scriptors at Berkeley.



PD-ROM sells for $100. For more information contact BMUG, 1442A Walnut St. #62, Berkeley, CA 94709; (415) 549-BMUG.

— *Ben Templin*

AHUG

There's good news for all you HyperCard lovers: Apple has opened up AHUG, the Apple HyperCard User Group, to anyone who has $10 and a desire to learn more about the medium. The organization, which used to be localized to employees of the Cupertino company, now sports a national membership that is expected to top out at 1,000 people by the end of the year.

Membership includes benefits like *Windows*, a bimonthly newsletter; Patterns, a monthly membership information sheet; STAKTrak, a stackware exchange program; and attendance at local monthly meetings and StackCopy sessions. Plans for training sessions and national meetings are underway.

Contact AHUG at 20525 Mariani Ave., M/S 27-AHUG, Cupertino, CA 95014. The telephone INFOLine for AHUG meetings, events, and addresses is (408) 974-1707.

— *Laura Johnson*

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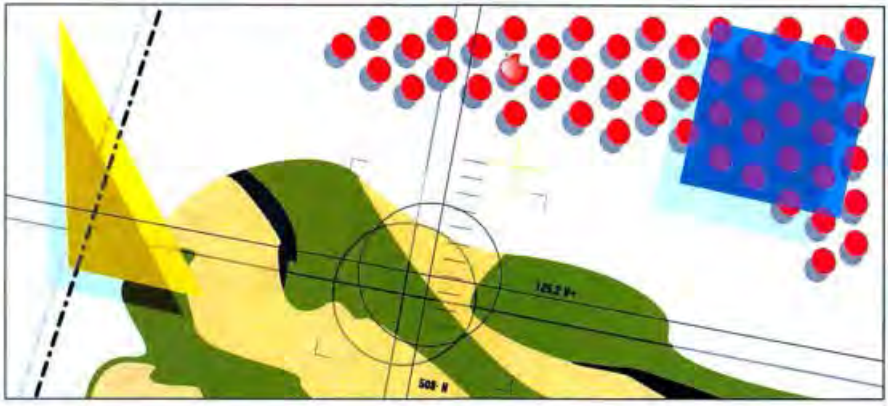
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A/UX ILIARY INFORMATION



/usr/blues, or Stalking A/UX in the Urban Maelstrom

Our courage and strength of heart are put to the test as we search for signs of A/UX life in the bowels of the Washington, D.C. Hilton.

BY JAMES FINN

Washington, D.C., August of a hot year. A friend described it as "your typical urban inferno." There I was, attending UniForum|DC to investigate the A/UX world. The hordes that attended Macworld Expo in Boston the following week griped about the heat, but Boston was a picnic; D.C. was the real thing. And like those adventure games in which danger at the outset indicates that greater dangers will follow, the sting of the Washington weather warned me to gather my courage for the ordeals to come.

For this was a government show. Sponsored by /usr/group, a non-profit trade association devoted to promoting the wonders of UNIX, UniForum|DC caters principally to one of the largest UNIX markets, the United States government. Prowling the floor were bureaucrats in search of the ultimate UNIX system to maintain their bureaucracy, while military procurers sought UNIX tools to build weapons for the '90s. And there, in a colorful booth prominently located near the floor's main entrance, was Apple, eager to convince these bureaucrats and weapons builders that A/UX is the solution for them.

Apple's own announcements were not too exciting — support for Posix and X-Window, and a telephone-hotline package (these were discussed in detail last month). But there were strong signs of life from third parties, most of whom displayed their wares at Apple's booth.

Serial Without Flakes

SuperMac was showing its new CommCard. For only $599, this serial communications card adds four RS-232C/422 serial ports to the Mac and solves the problem of A/UX's lack of support for AppleTalk. The card operates in either of two modes. AppleTalk mode works exclusively with A/UX and

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A/UXiliary Information

lets a Mac running A/UX use PostScript laser printers on an AppleTalk network. The Mac can use the same LocalTalk connection whether it is running A/UX or the Macintosh Operating System. If the A/UX machine (with the appropriate additional software) is functioning as an AppleShare server, CommCard lets the server run in the background. The card contains an Intel 80188 processor that handles the AppleTalk LAP protocol.

Serial mode works with either A/UX or the Macintosh Operating System, and it provides four serial ports. You can install multiple CommCards (up to five), either to add additional serial ports or to be able to use the AppleTalk and Serial

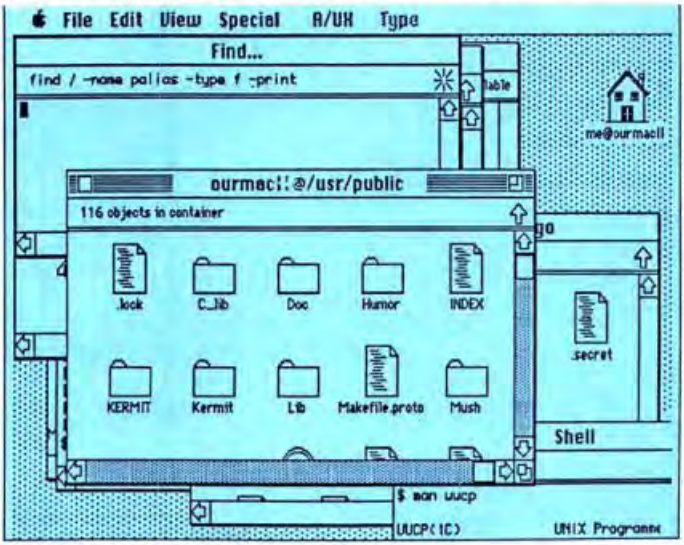


Figure 1: This familiar scene is courtesy of InterfaceR, which provides A/UX users with an interface that is similar to the Finder.

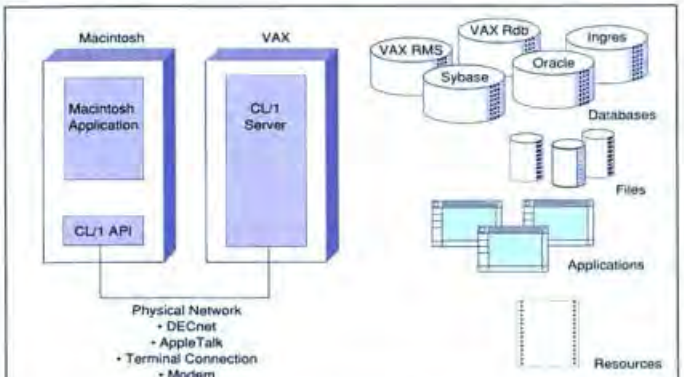


Figure 2: CL/1 will connect Macs to many VAX databases. The Macintosh communicates with a CL/1 Application Programming Interface (API), which sends the requests to a CL/1 server on the VAX.

MARK W. SWEENEY

modes simultaneously. Contact SuperMac Technology, 295 North Bernardo Ave., Mountain View, CA 94043; (415) 964-8884.

Finder Found

Tired of waiting for Apple to integrate the Mac Finder into A/UX? LIST SpA of Pisa, Italy, was showing InterfaceR, a program that provides a Finder-like A/UX interface (see Figure 1). InterfaceR displays a familiar desktop environment, with icons for UNIX files and directories. There is a functional menu bar, and you can add frequently executed commands to its A/UX menu. Shells can be run from windows. InterfaceR provides standard dialog boxes to help you piece together UNIX commands like *find* that have a complicated argument structure. The cost for this ease of use is $295. Contact LIST SpA, piazza mazzini, 6 1-56100, Pisa, Italy; telephone: 39 50 44023; AppleLink: ITA0079. In the United States contact LIST, P.O. Box 271, Stinson Beach, CA 94970; AppleLink: D0982.

DBMS To Go

A high-level database connectivity language from Network Innovations called CL/1 may represent the future of networked database access (see Figure 2). CL/1 integrates a database query language based on industry standard SQL with a C-like procedural language. Using CL/1, an application can access information on a remote database without having to know anything about the network used to connect the machines, the operating system on the remote computer, or the query language of the remote DBMS.

Initially, CL/1 will be implemented to let Macintosh and MS-DOS computers access host VAX computers running VMS. This will give desktop applications transparent access to Ingres, Oracle, Sybase, Informix, Rdb, and RMS databases. Machines can be connected using direct or dial-up serial connections or via AppleTalk networks. Network Innovations

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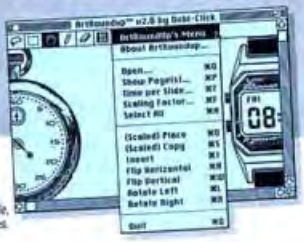
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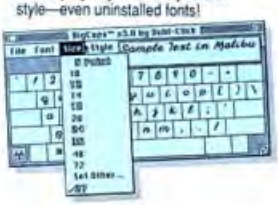
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will also embed CL/1 in HyperTalk external commands, so that HyperCard stacks can have full CL/1 capabilities.

CL/1's query facilities are based on SQL but contain extensions to unify the handling of flat files, nonrelational databases, error codes, and data dictionaries. Network Innovations has already published the language specification in *CL/1 Connectivity Language, Language Description.*

Network Innovations, founded in 1984, was purchased by Apple in March of this year and is now a subsidiary. You can reach the company at 20863 Stevens Creek Blvd., Cupertino, CA 95014; (408) 257-6800.

Hyper A/UX?

Imagine what HyperCard would be like if (1) instead of cards you worked with fully resizable windows, (2) you could have as many windows open as you wanted, (3) text fields came equipped with complete word-processing tools, (4) links were attached to words instead of to physical locations on a card, and (5) a stack could be read and changed by several users simultaneously on a network. A dream? This dream is a reality with Intermedia, a networked hypermedia system shown by Brown University's Institute for Research in Information and Scholarship (IRIS).

Running under A/UX, Intermedia is an important demonstration of what is possible when the power of UNIX is combined with the Macintosh interface.

Intermedia uses Sun Microsystems' Network File System (NFS), which A/UX supports, to provide multiuser access to documents. Invisible to the user, the Ingres relational database system (by Relational Technology of Alameda, California) runs in the background to maintain a shared relational database of all links among documents. Ingres manages concurrent access to and alteration of links by multiple users.

Developed as a research project at Brown, Intermedia has already been tested in courses in plant cell biology and English literature. Although the program is not a released product, IRIS is currently investigating ways to distribute it. Contact IRIS, Brown University, 155 George St., Box 1946, Providence, RI 02912; (401) 863-2943.

Gator Power

Cayman Systems released its $3,495 GatorBox, a gateway that connects LocalTalk and Ethernet networks. GatorBox translates between AppleShare's Apple Filing Protocol (AFP) and Network File System (NFS). To machines on LocalTalk, NFS file servers appear to be AppleShare servers, while NFS servers view Macs as NFS clients. This is done without any Cayman software running on any of the LocalTalk or NFS machines.

The GatorBox contains a 10-megahertz Motorola 68000 chip, as well as a 64K ROM and 1 megabyte of dynamic RAM to hold the networking software. The network administrator configures one or more GatorBoxes by running GatorKeeper, a Macintosh application. Future upgrades are planned to support additional network protocol suites. Contact Cayman Systems, One Kendall Square, Building 600, Cambridge, MA 02139; (617) 494-1999.

COBOL Mania

UniSoft Corporation was showing its optimizing C, FORTRAN, and Pascal compilers for A/UX, which have been shipping since March. Apple was most excited about the compiler that wasn't being shown, UniSoft's RM/COBOL-85 compiler. Apple is enthusiastic because there are apparently more lines of RM/COBOL code loose on the planet than the human mind can comprehend, and this compiler will make them portable to A/UX. The compiler is based on RM/COBOL 2, with which it is upwardly compatible, and supports both COBOL 74 and 85 standards. The compiler was in beta at press time and may have shipped by the time you read this. Contact UniSoft Corporation, 6121 Hollis St., Emeryville, CA 94608; (415) 420-6499.



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UPDATES

It's amazing how much action you can miss just by blinking, for example, the whole Tyson-Spinks fight. The same could be said of updates in Mac software. Admittedly, it's hard to keep up with all the new versions coming out, but it is important — it allows you to get the most out of your software. For those in the dark, here's a list of the most recent versions (as of press time) of many popular programs.

To see if you have the most current versions, check the About . . . item at the top of the Apple menu whenever you run a program.

In the realm of Apple System software, owners of 128K Macs should have System 2.0 and Finder 5.1.

For those with the 512K, 512KE, or XL, you should be running System 3.2 and Finder 5.3. Everyone else should be running System 6.0.1, which should be out by the time this hits the stands.

There's MORE (II) where presentation packages come from as Symantec's update to its presentation package boasts word processing and full drawing capabilities. In the midst of the System shuffle, Apple has managed to put out HyperCard 1.2.1. All's well that Findswell — 2.0, at least. Version 2.0 of this document locater adds a new button to open and save dialog boxes.

All programs listed here are HFS compatible. From this chart, you can extract the following information: CP or NCP, copy protected or not; //, programs we've found to be Mac II compatible (not yet a comprehensive list); and S, for shareware (try before you buy).

Changes and new listings are in **bold.** Programs that appear to be compatible with the Mac II may not actually perform 100 percent of the functions they do on other Macs, nor do they necessarily take full advantage of the Macintosh II.

A.A.I.S. Prolog	M1.15	NCP
Acta	2.0	NCP//
AMS General Ledger	2.08	NCP
AppleShare	1.1	NCP
Accountant, Inc.	2.1	NCP//
Aztec C	3.4b	NCP//
Backgrounder	1.2	NCP
Back to Basics	1.03	NCP
Balance of Power	1.03	CP
Bulk Mailer	3.0	NCP//
Business Filevision	1.1	NCP
CalendarMaker	3.0	NCP//
Capture	1.1	NCP//
Chart	1.02	NCP
Chooser	3.3	NCP
ClickArt Effects	1.01	NCP//
Clipper	1.01	NCP
CloseView	1.0	NCP
Cognate	1.5	NCP//
ColorChart	1.3	NCP
Colorizer	1.1	NCP//
ColorMate	2.1	NCP
ColorPrint	2.03	NCP
Comic Strip Factory	1.6	NCP//
Comic Works	1.0	NCP//
Comment	2.0	NCP//
ConcertWare+	4.0	NCP//
ConcertWare+ MIDI	4.0	NCP//
Control Panel	3.3	NCP
Copy II Mac	7.1	NCP
Copy II HD	7.1	NCP
Cricket Draw	1.1	NCP//
Cricket Graph	1.2	NCP
Curator	1.04	NCP//
DA Handler	6.0	NCP
Deluxe Music Construction Set	2.0	CP
Design/IDEF	1.1	NCP//
DesignScope	1.14	NCP//
DeskLink	2.0	NCP//
Disk Express	1.10	NCP
Disk First Aid	1.4	NCP
DiskFit	1.4	NCP//
DiskInfo	1.45	NCP,S
Disk Ranger	3.1	NCP
Disk Tools Plus	1.01	NCP//
DiskTop	3.0.2	NCP//
Dollars & Sense	4.0	NCP//
Double Helix II	r40	NCP//
"Draw It Again, Sam"	2.04	NCP//
Easy Access	1.0	NCP
Easy3D	1.01	NCP
Edit	2.1	NCP
Excel	1.5	NCP//
ExperCommon Lisp	2.2	NCP
ExperLisp	1.5	NCP//
ExperLogo	1.1	NCP
Expressionist	2.0	NCP
EZ Draft	2.0	NCP//
FastBack	1.02	NCP//
File	2.0	NCP//
Filemaker Plus	2.1	NCP//
Finder (MFS-128K)	4.1	NCP
Finder (HFS)	6.1	NCP
Findswell	2.0	NCP//
FlashBack	1.6	NCP
Flight Simulator	1.0	CP
Fokker Triplane	1.0	CP
FONTastic Plus	1.4	NCP,//
Font/DA Mover	3.8	NCP
Fontographer	2.3	CP
4th Dimension	1.0.6	NCP,//
Forecast	2.0	NCP,//
FoxBASE+/Mac	1.10	NCP,//
Frame Mac	1.1	NCP,//
FreeHand	2.0	NCP,//
FreeTerm	2.0	NCP,//
FullPaint	1.0	NCP
FullWrite Professional	1.0	NCP,//
Gato	1.42	CP
General	3.3	NCP
GeoQuery	1.01	NCP,//
Glue	1.04	NCP
GraphicWorks	1.13	NCP
Handwriting Analyst	1.2	NCP,//
Hard Disk 20	1.1	NCP
Hard Disk Utility	2.0	NCP
HD Backup	1.1	NCP
HD SC Setup Apple	2.0	NCP
HFS Backup	1.1	NCP
HFS Locator Plus	2.0	NCP
HyperCard	1.2.1	NCP,//
HyperDA	1.1	NCP,//
Illustrator	1.0	CP/NCP,//
ImageWriter	2.7	NCP
ImageWriter, AppleTalk	2.7	NCP
InBox	3.0	NCP,//
Insight Expert Accounting	2.01	NCP,//
Installer	2.6	NCP
inTalk	3.0	NCP,//
Jam Session	1.1	CP,//
Jazz	1A	CP
JustText	1.1	NCP
Keyboard	3.3	NCP
Key Layout	2.3	NCP,//
Laser Author	1.3	NCP,//
Laser Prep	5.2	NCP
LaserShare	1.0	NCP
LaserSpeed	1.6	NCP,//
LaserStatus	2.0	NCP
LaserWriter	5.2	NCP
Laser Writer IISC	1.1	NCP
Layout	1.3	NCP,S
Legal Billing	1.72	NCP,//
Legal Billing II	2.99	NCP,//
LightSpeedC	3.0	NCP,//
LightSpeed Pascal	2.0	NCP,//
Listen 2.0	2.1	CP,//
Lode Runner	1.0	CP
Lookup	1.0c	NCP,//
Mac3D	2.1	NCP,//
MacASM	1.2	NCP
MacBillboard	4.01	NCP,S
Mac C	5.0	NCP,//
MacCalc	1.2	NCP
Mac Daisy Link	1.04	NCP,//
Mac Disk Catalog II	2.1C	NCP
MacDraw II	1.0	NCP,//
MacDraft	1.2b	NCP,//
MacFlow	2.84	NCP,//
MacFortran (all)	2.3	NCP,//
MacGolf	3.0	CP,//
MacInTalk	1.1	NCP
MacLabeler	2.2	CP
MacMoney	3.01	NCP,//
MacMovies	1.02	NCP
MacNosy V2	2.8	NCP
MacPaint	2.0	NCP,//
MacPalette	1.0	CP
MacPascal	2.1	CP
MacProject II	1.0	NCP,//
MacProof	3.0	NCP
MacSafe	1.08	NCP,//
MacSchedule	1.0	NCP,//
MacSchedule	1.1	CP,//
MacScheme+ Toolsmith	1.51	NCP,//
MacServe	2.3	CP,//
MacSpec	1.3	CP
MacSpin	1.1	CP
MacSpool	3.0	NCP,//
MacTerminal	2.2	NCP
MacTools (MFS/HFS)	7.1	NCP
MacWrite	5.0	NCP,//
Mac Zap	5.0	NCP,//
MailManager	1.0	CP
Map	1.1	NCP
MapMaker	3.0	NCP,//
Mavis Beacon Teaches Typing!	1.2	NCP,//
MDA	2.0	NCP,//
MDS	2.0	NCP
Measure Test	12.7	CP,S,//
MenuFonts 2	2.0	NCP,//
Megamax C	3.0	NCP
MGMStation	2.0	NCP,//
MicroPhone	1.1	NCP,//
Micro Planner Plus	6.0	NCP,//
MindWrite	2.0	NCP,//
miniWriter	1.4	NCP,S
MockPackage+	4.3.4	NCP,S
Modern Artist	2.0	NCP,//
MORE	II	NCP,//
Mouse	3.3	NCP
MPW	2.0b	NCP
MS BASIC	3.0	NCP
MS BASIC Compiler	1.0	NCP
MS Fortran	2.2	NCP
MS Works	1.1	NCP,//
MultiFinder	6.0	NCP,//
Multiplan	1.11	NCP,//
MusicWorks	1.1	CP
myDiskLabeler	2.11	NCP,//
'Ncryptor	2.0	NCP,//
Neon	2.0	NCP
NightWatch	1.02	NCP,//
Omnis III Plus	3.25	NCP,//
OverVUE	2.1e	NCP,//
PackIt III	1.3	NCP,S
PageMaker	3.0	NCP,//
Parameter Manager Plus	2.2	NCP,//
Performer	2.3f	CP
PictureBase	1.2	NCP
Plains and Simple	4.1	NCP,//
PLP	2.0	NCP,//
PowerPoint	2.0	NCP,//
PowerStation	2.3	NCP,//
Print Monitor	1.2	NCP,//
Professional Composer	2.1	CP
Profit Stalker II	1.3	NCP
Programmer's Online Companion	2.0	NCP,//
Project Billing	3.0	NCP,//
QuarkXPress	2.0	CP/NCP,//
QUED/M	2.04	NCP
QuickKeys	1.1	NCP,//
QuickWord	2.0	NCP,//
Rags to Riches	3.0	CP,//
Ragtime	2.01	NCP,//
Read-It!	2.0	NCP,//
Ready, Set, Go!	4.0a	NCP,//
Record Holder	2.1	NCP
REdit	1.2	NCP
Red Ryder	10.3	NCP
Reflex Plus	1.01	NCP,//
Reports	1.2	NCP,//
ResEdit	1.1b7	NCP,//
Sargon III	1.0	CP
Scoop	1.01	NCP,//
Scrapbook	174K	NCP,//
SideKick	2.0	NCP
Silicon Press	1.1	NCP
Slide Show Magician	1.3	CP
Smartcom II	3.0A	NCP,//
SmartScrap & The Clipper	1.03	NCP,//
Sound	3.3	NCP,//
SoundCap	4.4	CP
Space Edit	2.0	CP,//
SpellNow	1.0	NCP
Spellswell	2.0f	NCP,//
Startup Device	3.3	NCP,//
StatView 512+	1.1	NCP
StatWorks	1.2	NCP,//
Stella	1.3	CP,//
Stepping Out I	1.3	NCP
Stepping Out II	2.0	NCP,//
Straight Talk	2.08	NCP,//
Studio Session	1.4	CP
Suitcase	1.2.1	NCP,//
SuperGlue	1.03	NCP,//
SuperPaint	1.00	NCP,//
Switcher	5.1	NCP
Systat	3.2	NCP
System (MFS-128K)	2.0	NCP
System (HFS)	6.0	NCP
Telescape	1.0	NCP,//
Telescape Pro VT 100	1.1	NCP
Tempo	1.2	NCP
Textures	1/01	NCP,//
Think 'n Time	2.0	NCP,//
ThinkTank	2.0	NCP,//
Thunder!	1.0.1	NCP
Thunderscan	4.0	NCP
TML Pascal	2.01	NCP
TMON	2.8	NCP
Top Desk	3.0	CP
TOPS	2.0	NCP,//
Trapeze	2.1	NCP,//
Turbo Download	2.1	NCP,//
Turbo Maccountant	2.0	NCP,//
Turbo Pascal	1.1	NCP,//
Type Now	1.0	NCP,//
VersaTerm	3.0	NCP
VersaTerm Pro	2.0	NCP
VideoWorks II	2.0	NCP,//
VIP	2.5	NCP,//
Widgets	3.0	NCP
Word	3.02	NCP,//
Write	1.0	NCP,//
WriteNow	1.07	NCP,//
XPress	1.1	CP/NCP,//
ZBasic	4.0	NCP

MINIFINDERS



Have you often wished for a personal assistant to help in picking software? These MiniFinders may not breathe and move, but they do tell you what products are hot and, better, what these products do. Each of these items has been carefully reviewed and selected by the *MacUser* editorial staff. Each has been rated in increments of half mice, from 1 to 5. Ratings are relative within categories, and they can change as categories expand and new products advance the state of the art. You won't see many low ratings or bombs, since we're telling you about the cream of the crop, but we will warn you about the really bad products so that you don't spend your money on them. Red names indicate this month's additions. The letters at the end of the entries indicate whether a product is copy protected (CP) or not (NCP). If a product has been reviewed or Quick Clicked in *MacUser*, the date of the review is shown. Eddy (Editor's Choice) Award winners are noted with a ★ and the year in which they won prizes for an excellent product. Next time you have to find products you can count on, count on *MacUser*!

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BUSINESS ACCOUNTING

Accountant, Inc. integrates accounts payable, accounts receivable, general ledger, and inventory modules. Prints checks, purchase orders, invoices, customized reports. Bare-bones accounting system limited in size and scope, but ease of use and integration make it suitable for small businesses. Requires 512K+. Version 2.0. $299. SoftSync, 162 Madison Ave., New York, NY 10016. NCP (Oct '87)
𝍸𝍸𝍸

Back to Basics Accounting is a powerful double-entry accounting software package for the small business user with GL, AR, and AP modules. Exhaustive manual with numerous examples. Report capabilities are excellent. $199. Peachtree, 4355 Shackleford Road, Norcross, GA 30093. NCP (May '87)
𝍸𝍸𝍸𝍸

BPI General Accounting is an easy-to-use system. Six journals, AR, AP, Payroll, and GL on one disk. Offset amounts automatically post to ledgers. Up to 8000 accounts. Detailed records, wide range of reports. Requires 512K+, $249. BPI Systems, 3001 Bee Cave Road, Austin, TX 78746. NCP (Aug '86)
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Insight is a high-powered accounting program for the small-to-medium-sized business. Modules include Accounts Receivable, Payables, and General Ledger; others are in the works. Requires 512K and hard disk. $595. Layered, 529 Main St., Boston, MA 02129. NCP (Dec '86) ★'86 Eddy
𝍸𝍸𝍸𝍸½

Rags to Riches integrated accounting modules (General Ledger and Accounts Receivable) uses Mac interface to the hilt. Information entered in one window automatically transfers. Detailed, flexible report options. Very easy to use, but it can be confusing with several windows on-screen. Requires 512K+ and printer. $199.95 per module. Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Dec '85)
𝍸𝍸𝍸𝍸½

Rags to Riches Professional Billing tracks and bills professional services. Batches activities for individual timekeepers. Use as stand-alone, or integrate with R to R modules. Requires 512K+, printer. $399.95. Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Feb '87)
𝍸𝍸𝍸𝍸

Simply Accounting has six ledgers and eight journals to handle the needs of most small-to-medium sized businesses. Better Mac interface than most. Payroll tax labels can't be modified, which forces you to subscribe to Bedford's yearly update service. Version 1.03. Requires 1 megabyte. $349. Bedford Software, 15311 N.E. 90th St., Redmond, WA 98052. NCP (Sept '88)
𝍸𝍸𝍸𝍸

Strictly Business General Ledger features clear, well-outlined set-up procedures and operations. Very flexible, up to 99 profit centers with up to 100 departments each, and customized reports. Program print spools. Requires 512K+, printer and external drive. $395. Future Design, 13681 Williamette Drive, Westminster, CA 92683. NCP (Dec '85) ★'85 Eddy
𝍸𝍸𝍸𝍸

Timeslips III tracks billing and expense information for people who charge by the hour. DA turns the clock on and automatically bills a client when a session is over. Version 1.06. Requires 512K and two disk drives. Mac II and MultiFinder friendly. $199.95. North Edge Software, 239 Western Ave., Essex, MA 01929. NCP (Sept '88)
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PERSONAL FINANCE

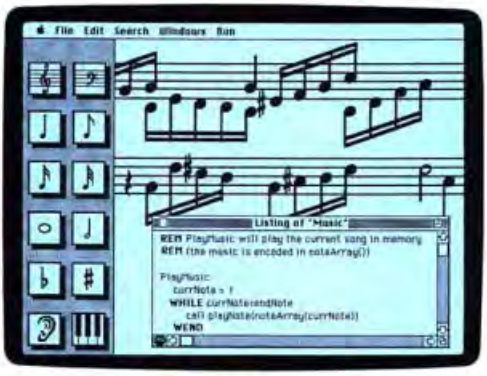
Dollars & Sense is a bookkeeping program. Easy to use, with a good manual and excellent on-screen help. Will handle up to 120 separate accounts or money categories. Uses standard double-entry accounting techniques. Will work on 128K. $149.95. Monogram, 8295 S. La Cienega Blvd., Inglewood, CA 90301. CP (Mar '87)
𝍸𝍸𝍸

Easy Checks puts your check register (or credit card records or any other simple financial account) into a desk accessory. Creating formats is rough, can't save reports to disk and there's no LaserWriter support. Requires 512K+. $44.95. PAR Software, P.O. Box 1089, Vancouver, WA 98666. NCP (Apr '88)
𝍸𝍸

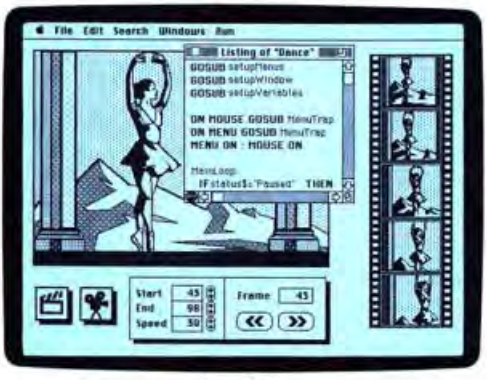
MacInTax is an excellent tool for preparing tax forms. Intuitive, easy-to-use. Accepts data from leading personal finance programs. Good built-in help. Liberal upgrade policy for current owners. California forms set also available. $119 federal; $65 California. SoftView, 4820 Adohr Lane, Suite F, Camarillo, CA 93010. NCP (Mar '87) ★'86 Eddy
𝍸𝍸𝍸𝍸𝍸

MacMoney is a financial manager that uses information gleaned from your checks and deposit slips. Produces a variety of reports and graphs. Version 3.1 reviewed. Requires 512KE and printer. $119.95. Survivor Software, 11222 La Cienega Blvd., Inglewood, CA 90304. NCP (July '88) ★'86 Eddy
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Teach your Mac to perform unnatural acts.



It can sing.



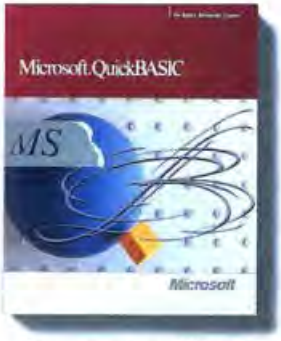
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MINIFINDERS



Quicken helps you write checks, then keeps a ledger showing you
★★★★★ where all of your money goes. Tax information is automatically generated. Version 1.0. Requires 512K and printer. $49.95. Intuit, 540 University Ave., Palo Alto, CA 94301. NCP (Nov '88)

Wall Street Investor spots stock market trends. Downloads infor-
★★★★ mation from an electronic service. Good charting ability. Previously known as Market Pro. Version 2.1. Requires 1 megabyte, two 800K drives or hard disk, Hayes-compatible modem, and an I.P. Sharp account. $495. Pro Plus Software, 2150 East Brown Road, Mesa, AZ 85203. NCP (Oct '88)

DATABASES

Business Filevision is a graphic database. Much more powerful
★★★ than the original, accepts MacPaint graphics. $395. Marvelin, 3420 Ocean Park Blvd., Santa Monica, CA 90405. NCP (Feb '86)

C.A.T. is a dedicated relational database for managing contacts,
★★★★ activities and time. Links between types of data make it easy to keep track of important people and events. $399.95. Chang Laboratories, 5300 Stevens Creek Blvd., San Jose, CA 95129. NCP (Nov '87)

dBASE Mac is a relational DBMS that includes a structured pro-
★★★★ gramming language to develop stand-alone applications. Palette icons as alternatives to menu commands will help novice users. Requires 1 megabyte +. $495. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319. NCP (Feb '88)

Double Helix II is a powerful database that supports a multiuser
★★★★½ environment with an upgrade. Uses an icon-based development system for easy creation of databases. $595, single-user version. Odesta, 4084 Commercial Blvd., Northbrook, Ill 60062. NCP (Apr '88)

FileMaker II is a multiuser version of the all-time best flat file man-
★★★★½ ager for the Macintosh. New features include more flexible layouts, hierarchical menus, and color on the Mac II. Version 1.0. Requires 1 megabyte with two 800K drives or a hard-disk drive. $299. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Dec '88)

4th Dimension is a versatile tool that creates stand-alone relational
★★★★½ databases. Design and layout environments allow easy linking of information. Robust. Pascal-like procedure language. $695. Acius, 20300 Stevens Creek Blvd., Cupertino, CA 95014. NCP (Nov '87) ★'87 Eddy

FoxBASE+/Mac is a relational database that can read unmodified
★★★★½ dBASE III PLUS applications created in the MS-DOS world. Amazingly fast. Good implementation of dBASE on the Mac. Version 1.0. Requires 1 megabyte. Mac II and MultiFinder friendly. $395. Fox Software, Inc., 118 W. South Boundary, Perrysburg, OH 43551. NCP (Sept '88)

MacDewey! is a cataloging program featuring the Dewey Decimal
★★★ Classification system. Uses predefined fill-in-the-blank fields to create catalog cards. Suffers from bugs in search routines and the inability to distinguish first names. Not for professionals; home libraries might benefit. Version 2.5. $79.95. Mousetrap Software, 336 Coleman Drive, Monroeville, PA 15146. NCP (Nov '87)

MacRelax is a relational list manager that stores data in a column
★★ format. Files can be related by sharing a common field. Flexible design for reports. Screen display is sometimes strange. Easy to use but not obvious to learn. $59.95. Requires 1 megabyte +. Arrays. 6711 Valjean Ave., Van Nuys, CA 91406. NCP (Jan '87)

Omnis 3 is a power database, featuring concurrent-multiple-file
★★★★ management. Can handle 24 files, 12 at a time, and is fully relational. Create custom environments, including user-defined menus, commands, and dialogs. $495. Blythe, 2929 Campus Drive, San Mateo, CA 94403. NCP (Mar '86)

OverVUE is a power-packed relational database that has extensive
★★★★½ sorting, summarizing, and report generation capacity. Has macros, and a charting function. Good manual. It can exchange files with a very wide variety of other programs (including IBM software). $295. ProVUE, 222 22nd St., Huntington Beach, CA 92648. NCP (Nov '85) ★'85 Eddy

Record Holder Plus is a flexible, easy-to-use, form-oriented data
★★★★ manager. Setup is particularly simple and the search features are powerful. $69.95. Software Discoveries, 137 Krawski Drive, South Windsor, CT 06074. NCP (Apr '86) ★'87 Eddy

Reflex for the Mac is a flexible relational database. Excellent report
★★★★½ generator gives full control over appearance, style of output. Requires 512K+, second drive, or hard disk. $99.95. Borland International, 4585 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Dec '86) ★'86 Eddy

Reflex Plus is a relational database with "smart" entry, and report
★★★★ design, but no overall programming facility. Simple to set up, yet fast. Graphic capabilities are quite limited. Version 1.0 reviewed. $279. Borland/Analytica, 4585 Scotts Valley Drive, Scotts Valley, CA 95066-9987. NCP (Feb '88)

Writer's Workshop maintains orderly records for writers. It can
★★★½ track manuscripts, income, and publisher. Based on and includes Runtime Helix. $99.95. Futuresoft System Designs, P.O. Box 132, New York, NY 10012. NCP (Apr '87)

NUMBER CRUNCHING

Data Desk Professional lets you visually look at statistics with
★★★★½ more ease than any comparable Macintosh program. Plots variables so you can analyze data to see what patterns develop. Version 2.0. Requires 1 megabyte and two 800K disk drives or hard disk. $495. Odesta, 4084 Commercial Ave., Northbrook, IL 60062. NCP (Nov '88)

DesignScope is a construction kit for digital and analog circuits. Up
★★★★ to 254 components can be utilized in a single circuit, and the equivalent of a dual-trace oscilloscope plots output in real-time. Good for testing circuitry without touching a breadboard. $249.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP (Nov '86)

Excel is THE power spreadsheet of the Mac. Has 256-column by
★★★★★ 16,384-row capability. Features include a powerful macro function (with a recorder to make creation simple) and elaborate charting facilities. 512K+ Mac and external drive required. $395. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP (Prem) ★'85 Eddy

MacSpin is a unique and powerful graphic data analysis program.
★★★★ Handles multivariate data in a highly visual manner. Nothing else like it for any micro. $199.95. D² Software, P.O. Box 9546, Austin, TX 78766-9546. CP (June '86) ★'87 Eddy

MacSQZ! compresses Excel files up to 88 percent of their actual
★★★★★ size. Good to free up disk space. Also contains password utility. MultiFinder hostile. Requires Excel. Version 1.01. $79.95. Turner Hall Publishing, 10201 Torre Ave., Cupertino, CA 95014. NCP (Aug '88)

Mathematica is a powerful tool for doing all kinds of math. Offers
★★★★½ arbitrary-precision numeric calculations, symbolic computation, PostScript graphics, and programmability. Version 1.03. Requires 1 megabyte+ and a hard-disk drive. 2 megabytes RAM required to run kernel. $495, $795 for the Mac II version. Wolfram Research, P.O. Box 6059, Champaign, IL 61821. NCP (Nov '88)

MathView Professional is an equation solver that combines two-
★★★★ and three-dimensional plotting with routines for matrices, differential equations and integrals, complex numbers, and

the like. Interface leaves a lot to be desired. Version 1.0. Requires 512KE and two disk drives. Mac II and MultiFinder friendly. $249.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP (Sept '88)

Microtemp Financial Calculators is a set of worksheets for Excel and Works that calculates common personal and small business financial problems. Includes cash flow, real estate and rate of return calculators. Version 1.0. $79.95. Microtemp, P.O. Box 1208, Santa Rosa, CA 95402. NCP (Aug '88)

Mindsight is a professional level, decision-support, and business planning package. Can work with IFPS on mainframes, and is able to transmit models in both directions. Powerful and easy to use. Requires 512K+. $249. Execucom Systems, P.O. Box 9758, Austin, TX 78766. CP (Dec '86)

Multiplan, the first Mac product from someone other than Apple, is beginning to show its age. Still a very capable basic spreadsheet with simple sorting, 63 columns by 255 rows, many built-in functions, other standard spreadsheet features. $195. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. CP (Mar '86)

Parameter Manager Plus is a data manager, incorporating integrated scheduling, statistics, and graphics. It has solid spreadsheet, calendar, and database functions and reports can be customized using other software. Parameter Manager can also import data from Excel or Lotus 1-2-3. $395. Rebus, 2330-B Walsh Ave., Santa Clara, CA 95051. NCP (July '87)

101 Macros for Excel offers all the power of macros without having to learn how to write them. Some gems include a macro to transpose rows and columns, and a search and replace macro. Requires Excel. $69.95. Macropac International, 19855 Stevens Creek Blvd., Cupertino, CA 95014. NCP (July '88)

GRAPHICS & DESIGN

ArtWare: Borders enables you to customize your own clip art disk. The border collection is the best package in terms of quality of art. Other packages available. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $129. Artware Systems, 3741 Benson Drive, Raleigh, NC 27609. NCP (Aug '88)

Canvas is a Draw and Paint program that uses QuickDraw as its output language. Full of features, including free rotation and one-and-two-point perspective. Also has graphics macro commands, unusual in a program this inexpensive. $295. Deneba, 7855 N.W. 12th St., Suite 202, Miami, FL 33126. NCP (Jan '88)

Chart can easily create area, bar, column, line, pie, scatter, and combination charts. A total of 42 styles are provided. Limited to 100 data items (64 in a series) on a 128K Mac, approximately twice that on a 512K Mac. $125. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. CP

Click & Clip offers seasonal graphics packages. Of the two quarterly editions released, the Spring '88 package is the better collection. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $39.95 per edition. Studio Advertising Art, P.O. Box 18432-52, Las Vegas, NV 89114. NCP (Aug '88)

ClickArt Special Effects is a MacPaint enhancement desk accessory. Allows the user to distort, stretch, rotate, and use perspective on MacPaint documents. A necessary addition for all serious users of MacPaint. $49.95. T/Maker, 1973 Landings Drive, Mountain View, CA 94043. NCP (Apr '86)

ColorPrint allows you to print FullPaint, MacPaint, MacDraw, and MacDraft documents in color using the ImageWriter II or Imagewriter I. Paint files set up as overlays are read into ColorPrint, and the program controls proper positioning registration. $29.95. I/O Design, P.O. Box 156, Exton, PA 19241. NCP (Mar '86)

Comic Strip Factory is an assembly program for creating comic strips. Includes a database of parts for various characters and backgrounds for panels. Good text editing in balloons. Can import and export in MacPaint format. $69.95. Foundation Publishing, 5100 Eden Ave., Suite 307, Edina, MN 55436. NCP (Dec '87)

Cricket Draw is an object-oriented drawing program that will produce stunning, high-quality output. Designed to print on PostScript-compatible devices, such as the LaserWriter. Making shadows and flowing fountain effects is just a point and click away. $295. Cricket Software, 40 Valley Stream Parkway, Malvern, PA 19355. NCP (May '87)

Cricket Graph easily generates 12 graph types. Multiple windows can be displayed. Graph prints in up to eight colors with up to 16 patterns. Self-generating macro formatting. Switcher, HFS, LaserWriter, and plotter compatible. $195. Cricket Software, 40 Valley Stream Parkway, Malvern, PA 19355. NCP (June '86) ★'86 Eddy

Cricket Presents is a presentation tool with strong emphasis on graphics. Good master template. Lacks import capability for text. Version 1.0. Requires System 4.2 or later. $695. Cricket Software, 40 Valley Stream Parkway, Great Valley Corporate Center, Malvern, PA 19355. NCP (Nov '88)

Crystal Paint creates an electronic kaleidoscope. It is MacPaint's Brush Mirrors gone wild in a small, simple, yet wonderful application. Does not work in color on Mac II. MultiFinder friendly. Requires 512K+. $49.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Feb '88)

Curator catalogs your art and graphics so it's easy to see what's what and where it is. Supports PICT, TIFF, EPSF, PostScript, MacPaint, and more. Changes creator types. Requires 512K and an 800K drive. $139.95. Solutions International, 29 Main St., Montpelier, VT 05602. NCP (Sept '88)

DeskPaint is a full-blown paint program as a desk accessory. Allows you to spruce up a graphic while in another application. Imports and exports MacPaint and TIFF images. Great for DTP, but not enough features to rival the leaders in paint programs. Zedcor, 4500 E. Speedway, Tucson, AZ 85712-5305. NCP (Mar '88)

Easy3D is a three-dimensional, solid modeling masterpiece. Four variable light sources, powerful sculpting tools, and an exquisite user interface make this a must-have for graphics enthusiasts. Requires 512K+. $149. Enabling Technologies, 600 S. Dearborn, Chicago, IL 60605. NCP (May '86)

EPS Illustrations is a potpourri of illustrations with no real focus. As an art package, this one is not very useful as you cannot alter any of the drawings. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $129.95. T/Maker, 1973 Landings Drive, Mountain View, CA 94043. NCP (Aug '88)

EZ Draft is a high-level CAD application. Does things usually only found on minicomputer programs. Uses "pop-up" menus to supplement a full set of pull-down menus. Comes with an additional set of printer/plotter/monitor drivers. A real powerhouse. $1995. $500 for IEGS module to link to other CAD programs. Bridgeport Machines, 500 Lindley St., Bridgeport, CT 06606. CP (May '87)

FastForms! Construction Kit is both a fast and efficient business forms creator (a drawing program) and a specialized application (and DA) to fill out the data fields in your forms. $149 (U.S.). Shana Enterprises, Advanced Technology Center #105, 9650-20 Ave. Edmonton, Alberta T6N 1G1, Canada. NCP (Nov '87)

Fluent Fonts is a two-disk collection of fonts. Forty-nine different items are included. All install easily in user systems. Most are well executed and some are extraordinarily nice. This is a

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MINIFINDERS

real bargain for font lovers. $49.95. CasadyWare, P.O. Box 223779, Carmel, CA 93922. NCP

Fontastic is a font editor that features a large editing window with a ★★★★ grid to make positioning easy. Select letters to edit by clicking on a matrix of the font. Allows scaling of existing fonts and previewing the various styles. $49.95. Altsys, P.O. Box 865410, Plano, TX 75086. NCP (Dec '85)

Fontographer is a complex, but excellent laser font creator. The ★★★★½ fonts created have 300 bits-per-inch resolution. The fonts are actually downloadable PostScript files. $395. Altsys, P.O. Box 865410, Plano, TX 75086. CP

FreeHand greatly simplifies the drawing of curves, the use of layers ★★★★½ and text handling when manipulating PostScript graphics. And it works in color on the Mac II. Requires 1 megabyte and two disk drives. $495. Aldus, 411 First Avenue South, Seattle, WA 98104. NCP (Aug '88)

FullPaint is an expanded version of MacPaint. Features include full-★★★★★ screen drawing, multiple documents opening simultaneously, brush editing, movable tool palettes, special text effects, and much more. It fills the gaps left by MacPaint. $99.95. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319. NCP (June '86) ★'86 Eddy

GraphicWorks 1.1 is a powerful drawing and painting program that ★★★★ creates high-resolution bit-maps. Easels contain graphics, balloons hold text, and both reside on panels. Graphic primitives are now a separate tool. $149.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. NCP (Oct '87)

Graphldex indexes MacPaint and MacDraw format graphics without ★★½ removing them from their original documents. Indexed graphics are retrieved via the Graphidex DA. Can modify an indexed graphic without affecting the original. Best for bit-mapped (Paint format) images, but the design is questionable and the execution imperfect. Requires 512K+. $124.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP (May '87)

Illustrator 88 is a professional-level graphics program from the ★★★★½ people who defined the PostScript language. Uses templates for precise drawing and detailed artwork. Requires 1 megabyte. $495. Adobe Systems, 1585 Charleston Road, Mountain View, CA 94039. NCP (Oct '88)

Image Club is an overwhelming collection of EPS clip art available ★★★★★ on disk and CD-ROM. Comes with a well-designed catalog of images. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $99. Image Club Graphics, 2915 19th St. N.E., Calgary, Alberta, Canada T2E 7A2. NCP (Aug '88)

ImageStudio puts a photo-retouching lab on the desktop. Editable ★★★★★ brushes let you modify digitized images in 65 gray levels. Version 1.0 reviewed. Requires 1 megabyte + and two 800K disk drives. Mac II and MultiFinder friendly. $495. Letraset USA, 40 Eisenhower Drive, Paramus, NJ 07653. NCP (June '88)

Images with Impact! brings clip art out of the turn-of-the-century ★★★★★ woodcut style and into a modern graphic sensibility. "Graphics and Symbols 1" is the first in a series. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $99.95. 3G Graphics, 11410 N.E. 124th St., Kirkland, WA 98034. NCP (Aug '88)

Japanese Clip Art is a two-disk set of extraordinary Japanese clip ★★★★½ art. Consists of MacPaint documents and separate fonts. Volume I, Heaven, covers mythological subjects; Volume II, Earth, has secular subject matter. $79.95 each volume; $149.95 each set. Qualitas Trading, 6907 Norfolk Road, Berkeley, CA 94705. NCP (Apr '87)

LaserFonts are new fonts for the LaserWriter. Users download ★★★★ them to their machines. Very high quality and very simple to use. Willamette looks like Avant Garde. MicroFonts provides tiny, expanded, and condensed versions of the LaserWriter's own fonts. $34.95 to $44.95 each. Century Software, 2483 Hearst, #175, Berkeley, CA 94709. NCP

LaserPaint's clumsy interface makes it a slow program. There's ★ good laser output if you persevere through the creation of a document. The support is scads better than the documentation. Version 1.1.4. $495. LaserWare, P.O. Box 668, San Rafael, CA 94915. CP (Jan '88)

Lasertalk is a PostScript programming tool that establishes interac-★★★★★ tive contact with laser printers. Preview window and on-line help make it a powerful tool. Requires 1 megabyte + and a PostScript Printer. $249. Emerald City Software, P.O. Box 2103, Menlo Park, CA 94026. CP until registered (May '88)

The Mac Art Dept. is a collection of over 150 graphic images ★★★★ ranging from foods to hands holding signs to borders. Best suited for letterheads, memos, other business use. $39.95. Simon & Schuster, Computer Software Div., 1 Gulf + Western Plaza, New York, NY 10023. NCP (Mar '86)

MacCalligraphy is the best simulation of brush painting in any graph-★★★★½ ics program. User-designed Seals and Touches enable you to design your own signature tool and the style of brush you use. Comes with a clip art disk. $175. Qualitas Trading, 6907 Norfolk Road, Berkeley, CA 94705. NCP (Feb '88)

MacDraft is an object-oriented graphics program. It sports ad-★★★★ vanced features such as variable scaling, single-degree rotation, complex arcs, and a FatBits-like magnification mode. Best used to complement MacDraw, not replace it. $269. Innovative Data Design, 2280 Bates Ave., Concord, CA 94520. NCP (Feb '86)

MacDraw is an object-oriented structured graphics program. Can ★★★★½ be used to design forms, create presentation materials, and do technical illustrations. Drawing sizes up to 8 feet by 10 feet are possible. Text can be easily generated and integrated in the graphics. $195. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Nov '85) ★'85 Eddy

MacDraw II updates the venerable object-oriented draw program ★★★½ so that it works on the Mac II. Adds color patterns in its own documents, but doesn't support color in the PICT II format. Version 1.0. Requires 1 megabyte, and two 800K disk drives or hard disk. $395. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Nov '85)

MacModel is an economical 3-D package with shading. Somewhat ★★★ sketchy Mac interface, shading speed slow (but acceptable), grainy image resolution. On-line help screens are a welcome addition. Frequent updates and low price make this a reasonably good buy. $40. A.P.P.L.E. CO-OP, 290 S.W. 43rd St., Renton, WA 98055. NCP (Aug '86)

MacPaint hasn't lost its shine after all these years. Still one of the ★★★★½ best freehand graphics tools. Version 2.0 supports multiple windows, design templates, and a magic eraser to correct corrections. Requires 512K and second disk drive. $125. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (July '88) ★'85,'87 Eddy

Mac3D is a feature-laden 3-D program with a MacDraw-like inter-★★★★ face. PostScript-resolution shading with six variable light sources, user-definable tools, and many more features make this a powerhouse. Version 2.0. $249. Challenger Software, 18350 Kedzie Ave., Homewood, IL 60430. NCP (Jan '87)

MapMaker is a digital cartographer that charts demographic and ★★★★½ marketing information on a geographic basis. Wide variety of maps available, some at an additional cost. Version 3.0. Requires 512K. $349. Select Micro Systems, 40 Triangle Center, Yorktown Heights, NY 10598. NCP (Dec '88)

MGMS: Professional CAD for MacIntosh offers more than 200 ★★★★ functions. Very complete, capable program. Groups, Dimension, Libraries, etc., are standard. Sometimes confusing —

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MINIFINDERS

designed for experienced, professional CAD user, not the novice. Full plotter support. 512K+. $799. Micro CAD/CAM, 3230 Overland Ave., Los Angeles, CA 90034. NCP (Nov '87) ★'87 Eddy

MiniCad is a pro-level CAD package. Vast array of features, many ★★★★ accessible only through Command/Shift/Option key combinations. Works in 2-D or 3-D with easy transition from one to the other. MacDraw-like interface makes it easy to learn and use. Version 3.0. Requires 512K+. Diehl Graphsoft, 8370 Court Ave., Suite 202, Ellicott City, MD 21043. CP (Oct '87)

Phoenix 3D is an economical 3-D drawing package, with features ★★★★ that belong in a more expensive program. Multiple light sources, fine object placement and orientation control, and a good selection of shapes. $49.95. Dreams of the Phoenix, P.O. Box 10273, Jacksonville, FL 32247. NCP (Oct '86)

PictureBase is a powerful graphic librarian. You can store paint and ★★★★½ PICT formatted items and attach keywords for later search and retrieval. $69.95. Symmetry, 761 E. University Drive, Mesa, AZ 85203. NCP (Sept '87) ★'86 Eddy

Pixel Paint is a color paint program with customizable palettes and ★★★★½ a lot of special effects. Slow Open and Save. Requires Mac II and 8-bit video card. $495. SuperMac Software, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (May '88)

Post Art I is a collection of signed originals on disk. Overall, a pretty ★ useless collection in terms of clip art. Meant for hanging prints on a wall. Requires a program that reads Encapsulated PostScript Format (EPSF) files. $69.95. Olduvai, 7520 Red Road, S. Miami, FL 33143. NCP (Aug '88)

PowerPoint is an easy-to-use desktop presentation tool. Good ★★★★ color schemes. Can send presentations to Genigraphics to produce color 35mm slides. Version 2.0. Requires System 4.1 or later, 1 megabyte and two 800K drives or hard disk. $395. Microsoft, 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717. NCP (Aug '87)

The Print Shop makes it easy to create greeting cards, signs, ★★★½ banners, and letterhead. Uses its own special graphics and can import Paint files. Hard-disk users get version 1.02 or later. $79.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. CP (Sept '87)

ReadySetShow is a presentation program built like a publishing ★★★★ program, with strong text and graphics support. Automatic text flow around graphic objects. Lacks good graphic examples. Version 1.0. Requires 1M and two 800K drives or hard disk. $395. Published by Letraset, 40 Eisenhower Drive, Paramus, NJ 07652. NCP (Nov '88)

Slide Show Magician is useful for creating full screen audio-visual ★★★ presentations on the Mac. Frame branching, improved editing capabilities, external cassette recorder synchronization, and digitized sound capabilities make this much more powerful than the original. Version 1.3. $59.95. Magnum, 21115 Devonshire St., Chatsworth, CA 91311. CP (Mar '86)

Space Edit is a 3-D CAD program. Display shows top, front, side, ★★★½ and axonometric views of an object, all at once or one at a time. Has standard CAD features plus zoom, exploded view, animated flyover. Suppression of hidden lines is very slow. Requires 1 megabyte +. $625. Abvent, 9903 Santa Monica Blvd., Beverly Hills, CA 90212. CP (July '87)

SuperPaint is a powerful, easy-to-use graphics program with all the ★★★★★ best features of MacPaint and MacDraw — and then some. LaserBits provides 300 dpi magnification and there are 40 editable brush shapes. Requires 512K+. $149.95. Silicon Beach Software, 9580 Black Mountain Road, P.O. Box 261430, San Diego, CA 92126. NCP (Feb '87) ★'87 Eddy

Trapeze is a powerful presentation worksheet that combines math-★★★★½ ematical functions and graphic representation. The interface, which consists of an icon bar, can be awkward to use. Mac II and color supported. Version 2.0. $395. Access Technology, 555C Heritage Harbor, Monterey, CA 93940. NCP (Dec '87)

TrueForm takes a scanned image of a paper form and turns it into ★★★★½ an electronic equivalent, complete with fields for entering data. It can automatically sum numeric fields. Requires external 800K drive. $495; run-time version, $295. Spectrum Digital Systems, 2702 International Lane, Madison, WI 53704-3122. NCP (May '88)

VersaCAD is a powerful CAD program that doesn't show any of its ★★★★ MS-DOS roots. Excellent element manipulation, full plotter support. Library user interface is crude. Requires 1 megabyte +. $1,995. VersaCad, 2124 Main St., Huntington Beach, CA 92648. NCP (July '88)

VideoWorks II is an easy-to-use animation tool — the best avail-★★★★½ able on the Mac. Has an Overview mode that acts as a slide show carousel for presentations. Works in color on the Mac II. $195. Requires 1 megabyte + and an 800K drive. MacroMind, 1028 W. Wolfram, Chicago, IL 60657. NCP (Mar '88) ★'85, '87 Eddy

VideoWorks II Accelerator compiles VideoWorks II movies to ★★★★ make them run more smoothly. Compensates for the QuickDraw screen display. Version 1.0. Requires 1 megabyte, VideoWorks II; hard-disk drive recommended. $195. MacroMind, 1028 West Wolfram, Chicago, IL 60657. NCP (Dec '88)

VideoWorks II Clip Animation, Clip Charts, Black and White Mov-★★★★ ies, and Clip Sounds are four separate aids to help you construct movies and business presentations. Requires VideoWorks II. $49.95 to $59.95. MacroMind, 1028 W. Wolfram, Chicago, IL 60657. NCP (Aug '88)

WetPaint consists of two three-disk volumes of very high quality ★★★★★ clip art. Also includes the Art Roundup DA, a good art browser/editor. Volume I or 2, $39 each; both volumes, $59. Available in PictureBase format for $15 extra per volume. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Sept '87)

World-Class Fonts! comes in two volumes of three disks each. ★★★★½ Includes all the Mac the Knife fonts and a lot more, including two useful utilities. This is now the best collection of ImageWriter fonts available. Each volume: $39; both volumes: $59. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Dec '86)

DESKTOP PUBLISHING

Interleaf Publisher is a speedy multiuser layout system for produc-★★★½ ing large, complicated documents. Has strong global formatting ability but can't use downloadable fonts. Requires Mac II with 5 megabytes of RAM and 40-megabyte hard disk, $2,495. Interleaf, 10 Canal Park, Cambridge, MA 02141. NCP (May '88)

JustText is a professional-level word processor and page makeup ★★★½ program that generates PostScript output. Comes with a set of LaserWriter utilities that allow total manipulation of art and text. Requires LaserWriter or other PostScript compatible output device. $195. Knowledge Engineering, G.P.O. Box 2139, New York, NY 10116. NCP (Dec '85)

MacTEX is the TeX environment of choice for hardcore TeX users on ★★★½ the Macintosh. Very intimidating for others. Painfully slow and visually unattractive. Version 2.0. Requires 1 megabyte +. $750. FTL Systems, 234 Eglington Ave. East, Toronto, Ontario M4P 1K5, Canada. NCP (Apr '88)

PageMaker retains its paste-up approach to page layout. New fea-★★★★★ tures include auto text flow, style sheets, and spot color support. The standard keeps getting better. Version 3.0. Requires 1 megabyte +, and a hard disk. $595. Aldus, 411 First Ave. South, Seattle, WA 98104. NCP (Aug '88) ★ '85, '87 Eddy.

XPress Yourself!

QuarkXPress™, the complete electronic design and production environment, provides all of the resources you need to get the job done. Full featured word processing, powerful graphics editing and global search & replace functions are just a few of its exceptional features. And while QuarkXPress is already recognized for its superb typographic and layout capabilities, these convenient tools make Version 2 a pleasure to use. MacUser magazine thought so when it awarded QuarkXPress its highest rating for desktop publishing software.

But for all of its capabilities, QuarkXPress is remarkably easy to learn and to use... which means that you'll be able to take advantage of its power quickly. And now, Version 2 has an expanded palette of new features, such as image manipulation, style sheets and advanced color features.

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MINIFINDERS

Portfolio: Designs for Newsletters provides more than 20 templates for two-page newsletters with preset columns, headlines, graphics, and captions. Documentation provides excellent tutorial in page design. Requires 512K+; PageMaker. $79.95. Aldus, 411 First Ave. S., Suite 200, Seattle, WA 98104. NCP (May '87)

QuarkXPress is a high-end desktop publishing application. Layout is done in block format; powerful lining tool ties blocks together. $695. Quark, 200 S. Jackson, Denver, CO 80209. NCP (Sept '87)

Ragtime is an "Integrated Page Processor" with text, graphics, and built-in spreadsheet. Flow text automatically from one frame to another. Spreadsheet has a full set of functions. Excellent, easy-to-use program. Requires 512K+. $395. Orange Micro, 1400 N. Lakeview, Anaheim, CA 92807. NCP (Aug '88)

Ready, Set, Go! 4 has an elegant interface and excellent manual. Powerful text wraparounds, fast word processor with hyphenation and spelling check and custom stylesheets. Requires 1 megabyte +. $495. Letraset, 40 Eisenhower Drive, Paramus, NJ 07652. NCP (Feb '88) ★'86 Eddy

TeXtures is an implementation of TeX, the big daddy of typesetting programs. Good for people trained on mainframes in the early days. Otherwise very sticky with a high learning curve. Version 1.0. Requires 512K+. $495. Blue Sky Research, 534 S.W. Third Ave., Portland, OR 97204. NCP (Apr '88)

COMMUNICATIONS

AppleShare is the file sharer marketed by Apple. Software-based, AppleShare requires you to dedicate a Mac and a hard disk to run it. Allows users on the network to protect things from other users on the folder level. Interface to network is provided at a revised Finder. $799. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (May '87)

ComServe allows you to share a Hayes-compatible modem over an AppleTalk network. You can call out, but you can't call in. Works with most telecommunications packages. $195 per server. Infosphere, 4730 S.W. Macadam Ave., Portland, OR 97201. CP (Feb '88)

Desktop Express is a simple-to-use, semi-automated program for using MCI Mail and Dow Jones News/Retrieval. Performance is traded off for ease of use. Requires 512K+. $149. Dow Jones, P.O. Box 300, Princeton, NJ 08543. NCP (Jan '88)

HomePak is a package consisting of HomeTerm, an excellent, simple telecommunications program with strong macro features; HomeFind, an electronic filer as bad as HomeTerm is good; and Apple's Edit, a simple, non-HFS-compatible text-file editor. $49.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Sept '86)

InBox is an easy-to-use mail system. It's called up from a desk accessory. Has a very slick interface. Dedicated Mac not required. $350 for starter set, which includes one Administrator disk and three Connection disks. Additional Connections cost $125 each. Think Technologies, 135 South Road, Bedford, MA 01730. NCP (May '87) ★'86 Eddy

InTalk comes with its own communications command language able to do unattended sessions. Supports Xmodem and MacBinary. Has a macro key function. Many sample setup documents and command language files provided. $195. Palantir, 12777 Jones Road, Houston, TX 77070. NCP (Prem)

LapLink Mac quickly transfers data to and from the MS-DOS and Mac environments. Kit contains a cable and software. Control of transfer is on the IBM side. Version 1.2. Requires 512K. $139.95. Traveling Software, 19310 North Creek Parkway, Bothell, WA 98011. NCP (Aug '88)

MacTerminal provides basic telecommunications and terminal emulation. Doesn't have macros nor any sort of auto redial/auto log-on capability. Best for those needing faithful VT100 or IBM 3278 emulation — it is superb at those. $125. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Prem)

MacWorkStation is a development environment and communications program that accesses custom mainframe applications through the Macintosh interface. Modular design allows for expandability. Mac II and MultiFinder friendly. Version 3.0. $2,500 for internal use license, $5,000 for commercial use license. Apple Software Licensing, 20525 Mariani Avenue, Cupertino, CA 95014. NCP (Oct '88)

MicroPhone is a high-powered terminal program that's easy enough for novices. Very powerful command language allows full automation of communications, if desired. $295. Software Ventures, 2907 Claremont Ave., Berkeley, CA 94705. NCP (July '86) ★'86 Eddy

Microsoft Mail is an electronic mail system that runs under AppleTalk. Supports file transfers across the mail system. Full online help facility. Also includes "While you were out" messages. Desk accessory based. Prices determined by number of users licensed. One to four users, $299.95; five to 10 users, $499.95; 11 to 20 users, $749.95; 21 or more users, $949.95. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP (May '87) ★'87 Eddy

Red Ryder is a full-featured telecommunications program that supports MacBinary, Xmodem, and Kermit. Has big screen-support, auto procedure creator, and up to 30 keyboard macros. This is the cream of the crop (in late '87). $80. Freesoft, 150 Hickory Drive, Beaver Falls, PA 15010. NCP (Dec '87) ★'87 Eddy

Smartcom II balances power and ease of use. Capable of unattended operation and has a very powerful command language. Supports MacBinary, Xmodem, and Hayes Verification protocols. The large-screen buffer can easily be archived. $149. Hayes, 5923 Peachtree Industrial Blvd., Norcross, GA 30092. NCP (July '86) ★'85 Eddy

Telescape is the power telecommunicator's terminal program. Can be configured to emulate any terminal. The documentation does not adequately explain the many features. $125. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (June '86)

TOPS is a file server designed to network computers with different operating systems. Supports Macs, MS-DOS compatibles, and UNIX. Access to files and subdirectories is transparent to the user; they appear as Mac folders. Only handles ASCII or Text files. $249 for Mac version. TOPS, 950 Marina Village Parkway, Alameda, CA 94501. Serial number protected. (May '87) ★'87 Eddy

VersaTerm-Pro is a very powerful terminal program with several special features. Does one of the best VT100 emulations available and specializes in high-quality Tektronix 4014 and 4105 emulation. A pro's tool. Requires 512K+. $295. Peripherals, Computers & Supplies, 2457 Perkiomen Ave., Mount Penn, PA 19606. NCP (Apr '87)

WORD PROCESSORS

Document Compare allows users to compare any two MacWrite 4.5, ASCII, or MDS documents. Differences in spelling, punctuation, formatting, and wording are detected. Documents can be printed out with differences highlighted. $99. Legalware, 33 Young St., Toronto, Ontario M5E 1S9, Canada. NCP (May '86)

Document Modeler can automate much of a professional office's correspondence. Comes in two parts: Template Maker and Document Maker. Initial setup requires time and is complex.

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MINIFINDERS



$299.95. Legalware, 33 Young St., Toronto, Ontario M5E 1S9, Canada. NCP (Mar '87)

Doug Clapp's Word Tools is a useful punctuation and style-editing program. It won't turn you into a Proust, but it will help you make your writing cleaner and clearer. Word counts among different formats show discrepancies, but not to worry. Requires 512K+. $79.95 Aegis Development, 2125 Pico Blvd., Santa Monica, CA 90405. NCP (Sept '87)

Expressionist is a powerful DA that allows you to create complex mathematical equations from within an application. Equation manipulation has never been easier. $79.95. Allan Bonadio Associates, 1579 Dolores St., San Francisco, CA 94110. NCP (July '87)

FullWrite Professional combines outlining and word processing with page layout and drawing. Its many features translate into sluggish performance unless you have a lot of extra RAM. Impressive. Version 1.0. Requires 1 megabyte. Mac II and MultiFinder friendly. $395. Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502. NCP (Sept '88)

Graham Speller is a desk accessory-based spelling checker. Includes macro feature. Good guesser in interactive mode. Clumsy interface. Version 1.1. $44.95. Graham Software, 8609 Ingalls Circle, Arvada, CO 80003. NCP (Sept '88)

Kadmos Greek Font is a full character set of ancient Greek that prints on any PostScript printer. Requires learning new typing skills, but excellent quality makes it worth the effort. $85. Allotype Typographics, 1600 Packard Road, Ann Arbor, MI 48104. NCP (Oct '87)

Liberty Spell Checker is a fast, effective, interactive checker. The dictionary is smaller than average, but well chosen. Unfortunately, it has a few misspelled words. $59.95. DataPak, 14011 Ventura Blvd., Sherman Oaks, CA 91423. CP (Oct '86)

MacGAS is a DA spelling checker with both a small and extended dictionary. Its best point is the excellent thesaurus. Provides antonyms and glossary. A slow checker. $99. EnterSet, 2380 Ellsworth, Berkeley, CA 94720. CP (Oct '86)

MacProof is a grammar, style, and spelling checker that's like having your own personal copy editor. Grammar rules are fixed, and you may not agree with the choices. The program only suggests corrections, it doesn't make them for you. And the checking process can be slow if your document is long. $195 for stand-alone version; $2,500 for networked version. Automated Language Processing Systems, 190 W. 800 North, Provo, UT 84604. NCP (Apr '87)

Macspell+ is a spelling checker that installs as a desk accessory. Works easily with MacWrite 4.5 and 2.2 and Word, but has some drawbacks. New version 1.10 just available. Requires 512K+, two drives or hard disk. $99. Creighton Development, 16 Hughes St., Irvine, CA 92718. NCP

MacWrite is starting to show its age. While still a good, basic program, it's out-performed by its competition. Probably enough for the occasional user. Version 5.0 includes command key equivalents and spelling checker. Requires 512KE+. $125. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (June '88) ★'85 Eddy

MergeWrite is a mail-merge program for MacWrite (also works with ASCII files). Program combines names and addresses from a data file into predefined fields in a form letter. Also allows simple conditional IF-THEN-ELSE equations. $49.95. Software Discoveries, 137 Krawski Drive, South Windsor, CT 06074. NCP (Dec '87)

MindWrite integrates outlining and word processing better than anyone. Version 1.1 fixes many problems of the earlier version. Sophisticated search and select options. Unimpressive speed. $295. Access Technology, 555C Heritage Harbor, Monterey, CA 93940. NCP (Feb '88)

QUED/M is an excellent text editor that saves documents in a form readable by most computers and printers. Doesn't support graphics or multiple fonts. Programming language allows creation of database. Version 2.01. $129. Paragon Concepts, 4954 Sun Valley Road, Del Mar, CA 92014. NCP (Mar '88)

Scriptor is designed for producing standard-format scripts. Starts with a Word document. As you change your Word document, Scriptor will reformat, renumber, and reprint the script. Supports LaserWriter and daisywheel printers. $295. Screenplay Systems, 348 E. Olive Ave., Suite F, Burbank, CA 91502. NCP (May '87)

Sensible Grammar corrects some of the more glaring errors that writers make. Also analyzes the word count and structure of sentences to come up with a readability rating. Slow. Version 1.1d. Requires 512K. $99.95. Sensible Software, 335 E. Big Beaver, Suite 207, Troy, MI 48083. NCP (Dec '88)

Spelling Champion is a fast and accurate batch-type spelling checker. Back-up feature allows you to undo corrections in a paragraph. Works only with MacWrite 4.5. $39.95. Champion Software, 6617 Gettysburg Drive, Madison, WI 53705. NCP (Oct '86)

Spelling Coach Professional is a desk accessory and stand-alone spelling checker as well as thesaurus. Includes dictionary definitions. Off-the-wall phonetic guesses. Version 3.0. $195. Deneba Software, 7855 N.W. 12th Street, Suite 202, Miami, FL, 33126. NCP (Sept '88)

Spellswell is a stand-alone batch spelling checker. Also checks for punctuation and other errors. Good dictionary, thorough checking, simple interface. Weak guessing. Version 2.0. $74.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061. NCP (Sept '88) ★'86 Eddy

Thunder! is a desk accessory spelling checker. Includes macro features. Fairly fast, good guessing of misspelled words. Small dictionary. MultiFinder hostile. Version 1.1. $49.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Sept '88)

Word Finder is an electronic thesaurus that won't replace your trusty Roget's, but is still useful for checking synonyms on the fly. Large, respectively. Version 2.0. Requires 512K. Mac II and MultiFinder friendly. $59.95. Microlytics, 300 Main St., Rochester, NY 14445. NCP (Sept '88)

Word 3.02 is the most feature-laden word processor around. Also has Microsoft's somewhat unusual view of what the Mac interface is. Esoteric command key combinations. Requires 512K+. $395. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073. NCP (Mar '88)

WorksPlus Spell is a speedy spelling and hyphenation checker for Microsoft Works. It includes a glossary for abbreviations and time/date stamping. The biggest drawback is its limitation to one program. $59.95. Lundeen & Associates. P.O. Box 30038, Oakland, CA 94604. NCP (Oct '87) ★'87 Eddy

Write is a "beginner's" version of Word 3.0. More features than some word processors in its class, but not all of the features work well. Poor value, and expensive upgrade path to Word. $175. Requires 512K+. Microsoft, 16011 N.E. 36th Way, P.O. Box 97017, Redmond, WA 98073-9717. NCP (May '88)

WriteNow for the Macintosh has many of the features of MacWrite and then some, including the ability to work in columns. Has built-in spelling checker with 50,000-word dictionary. $175. T/Maker, 1973 Landings Drive, Mountain View, CA 94043. NCP (Mar '87)

SYSTEM SOFTWARE

HyperCard is a totally unique program for the Mac. It uses an index-card metaphor and it contains a programming language, HyperTalk. Requires 1 megabyte +. Free with new Macs

MacUser

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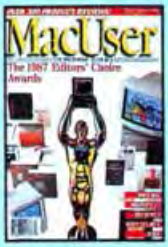
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April '88—Highlights of San Francisco Mac Expo '88; Double Helix II review/tutorial; 4th Dimension power guide; MacTex and Textures desktop publishing software compared; top-quality halftones with Thunderscan; OCR for every scanner; Design 2.0: the ultimate organizer?; GCC's Personal Laserprinter; and more.



March '88—When Speed Counts; Focal Point and Business Class the new commercial stocks; Microsoft Word 3.01; QUED/M and Stepping Out programs; Apple's new System software: worth the price?; VideoWorks II; See Mac Read; Trust and Betrayal: how's your aura?; and more.



February '88—The 1987 Editor's Choice Awards; dBase Mac; Mindwrite 1.1 adds more power; Ready, Set, Go! 4 will take over Pagemaker?; Reflex Plus; Scoop; ImageMaker's 35mm slide capabilities; picking a compiler; two modem-sharing solutions; Oriental graphics with MacCalligraphy; and more.



January '88—QuickKeys: using the mouse as an accessory. Plus: Why Canvas wins out over LaserPaint; MacSmarts and Instant Expert compared; Hypertext in 512K; Hypercard programming tutorial; Desktop Express e-mail; Macintosh Programmer's Workshop examined, Part I; making Postscript special effects work; and more.



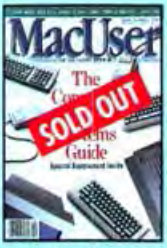
December '87—HyperCard: royal flush or bluff?; Trapeze 2.0; hard disk preventive care and cures; the arrival of Red Ryder 10.0; The Comic Strip Factory; feats of magic with Time Wand; Master Tracks Pro: the best Mac MIDI sequencer?; a guide to Castle Shadowgate game; report from the Seybold Desktop Publishing Conference; and more.



November '87—4th Dimension: the ultimate data base?; unlimited font and DA access with Suitcase; a roundup of new and updated accounting programs; supercharging your SE; personal organization made simple, with C.A.T.; how to leave notes for yourself, with Comment; professional CAD/CAM on the Mac; and more.



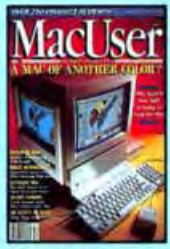
October '87—Laser Wars! Postscript printer free-for-all; Course Builder educational program developer; utilizing the full power of Excel; PageMaker 2.0; still the standard?; JustText Postscript desktop publishing program; Fontographer; GraphicWorks 1.1; Jam Factory and M music programs; and more.



September '87—Special Supplement: "The Complete MacUser Systems Guide" includes guide to configurations, systems guide directory, and more. Plus: Xpress; Doug Clapp's Word Tools; Douglas Adams on Word 3.0; GraphicWorks 1.1 and SuperPaint compared; recycling ImageWriter ribbons; and more.



March '87—Special section on new word processors reviews Laser Author, MindWrite, Word Handler, Word 3.0 and WriteNow; MacinTax tax preparation software; 5 time-saving printer buffers compared; 5 AI languages reviewed; Mac Pro Football; FREE program in Softstrip format; and more.



December '86—Why Apple's new IIGS is going to help the Macintosh; Accounting Plus; PhoneNET saves money without sacrificing quality; inBOX E-mail system; Studio Session adds more voices to the Mac; Doug Clapp on the secrets of Pascal; StatView 512+; Compiled ZBASIC; FREE programs in Softstrip format; and more.

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MINIFINDERS

and bundled with many HyperCard stacks, otherwise $49.95. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Dec '87) ★'87 Eddy

SoftPC puts an IBM PC/XT inside your Mac without cracking the ★★★½ case to add any special coprocessor boards. The emulation of an MS-DOS machine is done entirely in the software. Version 1.2. Requires Mac II or SE equipped with 68020 accelerator card; 2 megabytes of RAM. $595. Insignia Solutions, 1255 Post St., Suite 625, San Francisco, CA 94109. NCP (Nov '88)

System Tools 5.0 is the Apple System upgrade for Mac Plus, SE, ★★★★ and II owners. It contains MultiFinder (a multitasking environment), a LaserWriter spooler, and a Control Panel resource to add color on the Mac II desktop. Requires 1 megabyte +. $49. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (Mar '88)

System Tools 6.0 contains an improved version of MultiFinder and ★★½ new features like CloseView (for visually impaired users), Map, and MacroMaker. Incompatible with many programs; lots of small bugs. Requires 1 megabyte. $49. Apple Computer, 20525 Mariani Avenue, Cupertino, CA 95014. NCP (Nov '88)

HYPERCARD

Business Class is a HyperCard stack that contains world travel ★★★½ information and itinerary planning. Uses maps to locate countries of interest, but it lacks United States domestic travel information. Requires 1 megabyte + and HyperCard. $49.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Mar '88)

City to City imparts travel information on 31 U.S. cities including ★★★★ details on hotels, restaurants, and nightlife. Helps plan an itinerary. Requires HyperCard, two disk drives, and a printer. $49.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Sept '88)

Focal Point is a HyperCard stack that ties together a calendar, ★★★★½ phone log, client accounts, and more in one easy-to-use organizational tool. Requires 1 megabyte + and HyperCard. $99.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Mar '88)

HyperBook Maker adds many of the printing utilities that Hyper- ★★★ Card lacks. Best used to figure out signature breaks to print pamphlets. Version 1.1a reviewed. Mac II and MultiFinder friendly. $59.95. Ideaform, 612 West Kirkwood, Fairfield, IA 52556. NCP (June '88)

HyperAtlas is a collection of U.S. and World maps that are ★★★ networked to stacks containing economic, political, and population data. Version 1.0. Requires HyperCard and second disk drive or hard disk. $99. MicroMaps Software, P.O. Box 757, Lambertville, NJ 08530. NCP (Oct '88)

HyperDA lets you browse through HyperCard stacks through a desk ★★★★ accessory. A true equalizer for 512K Mac owners who cannot normally access stackware. Doesn't support global variables. Requires 512K+. $69. Symmetry, 761 E. University Drive, Mesa, AZ 85203. NCP (May '88)

HyperTutor is a stack that teaches HyperTalk, Hypercard's pro- ★★★★½ gramming language. Uses an interactive Test Mac on each

4th Dimension: A Complete Guide to Database Development

by Tim Knight



Perfect for beginning and advanced users alike, this book will help you get the most out of Acius, Inc.'s powerful and versatile database development software for the Macintosh, 4th Dimension. Beginning with the basics — entering and editing data — the book progresses through such advanced techniques as creating subfiles, linking files, using the layout toolbox, and programming to help you develop high quality, customized databases for your Mac. **Softbound, 480 pages, $21.95**

The Complete Guide to dBASE Mac

by Dan Shafer and Don Huntington



This comprehensive guide provides strategies and techniques for creating and maintaining your own databases, using Ashton-Tate's powerful and flexible DBMS software for the Macintosh. In it, you'll find everything you need to know about designing, implementing, debugging, and supporting a database management system, including an in-depth coverage of View, documentation of dBASE Mac's built-in programming language, and much more. **Softbound, 528 pages, $21.95**

MacLANS: Local Area Networking with the Macintosh

by Mark D. Veljkov



Now you can make better decisions while improving your on-line communications. This practical reference and buying guide will help you choose, set up, and use a LANs with Macintosh computers. In it, you'll find information about the companies that manufacture MacLANs; advice on configuration, setup and installation; details about peripherals including modem servers, add-on cards, and internetwork bridges; and much more. **Softbound, 318 pages, $21.95**

Design Principles for Desktop Publishers

by Tom Lichty



Suitable for users of any company system or desktop publishing software, this book will guide you through the steps of designing a document with visual impact, appeal, and a stylish, professional look. The book offers specific advice and information about page design; typography, including leading, kerning, picas, points; how and when to use illustrations, borders, rules, ornaments, line art and photography; and much more. **Softbound, 256 pages, $19.95**

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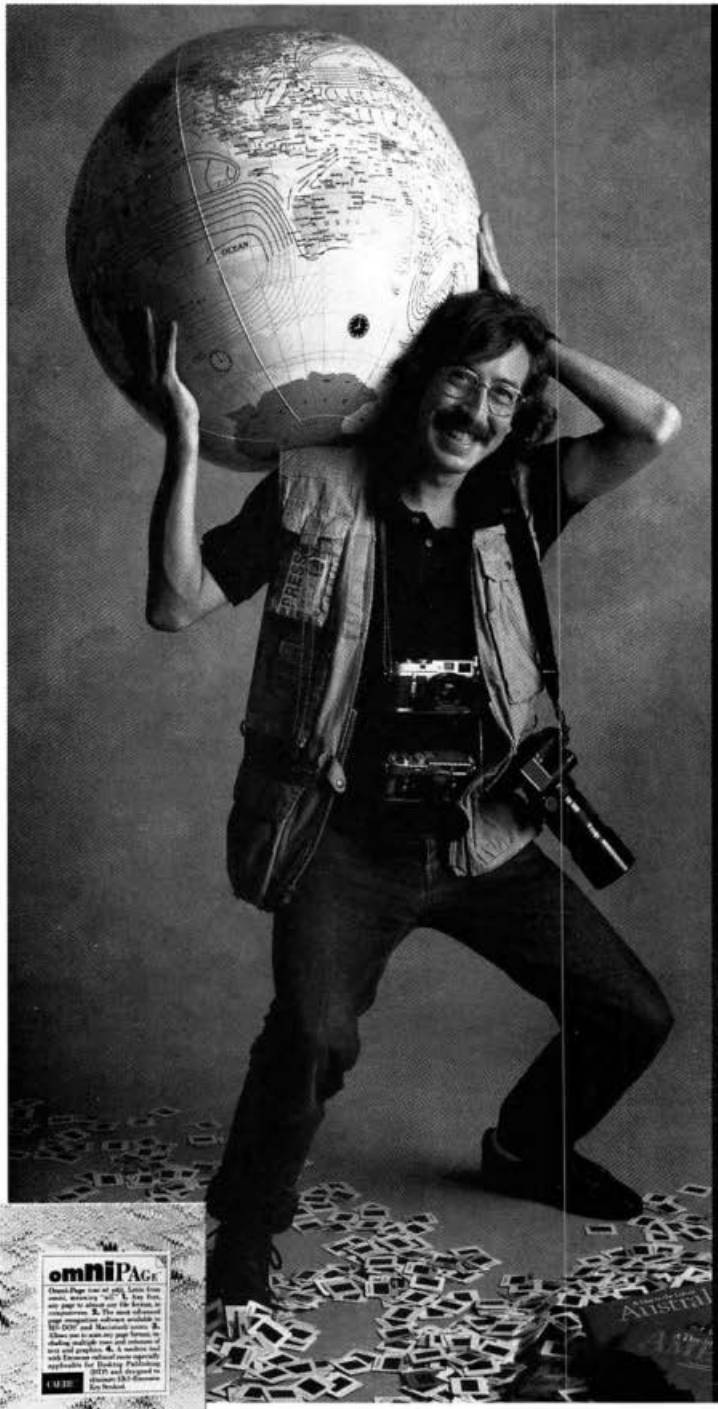
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Customer Profile

Rick Smolan

Age: Withheld upon request.

Profession: World class photographer, entrepreneur and inspirational force behind the now famous *Day in the Life of Australia; Day in the Life of the Soviet Union; Day in the Life of America*—you get the picture.

Hobbies: When he's not taking photos in exotic places like Bangkok, Nairobi or Cairo, Rick enjoys kicking back, relaxing, and possibly doing some serious scanning of articles related to one of his favorite subjects—Levitation as practiced by Tibetan monks.

His Page Recognition Software: *OmniPage*, of course. Why else would we have him in our ad? According to Rick: "Coordinating 100 photographers in the Soviet Union for a one day photo shoot is no easy task for a small group like ours—despite what you hear about glasnost. Especially when you have to put an entire book together in a matter of weeks. When we're on assignment each photographer turns in notes—about a given shot—in whatever language he or speaks. You can imagine some of the type styles we have to deal with. When do you guys think you'll be able to handle the Cyrillic alphabet?"

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card to write scripts. A variety of windows makes it good for both beginners and advanced programmers. $49.95. Channelmark, 2929 Campus Drive, San Mateo, CA 94403. NCP (Apr '88)

Reports endows HyperCard stacks with the power to sort and im- ★★★½ part information like a database. Customizing reports is difficult. Requires HyperCard. $99.95. Activision, Inc., 3885 Bohannon Drive, Menlo Park, CA 94025. NCP (Aug '88)

ScriptExpert helps you generate HyperTalk scripts by leading you ★★★★ through the correct use of the language. Select a common command, and dialog boxes prompt you for necessary components. Version 1.0. Requires HyperCard. $79.95. Hyperpress Publishing, P.O. Box 8243, Foster City, CA 94404. NCP (Oct '88)

VideoWorks II HyperCard Driver lets you play movies directly from ★★★½ a stack. One way to add color animation to HyperCard. Version 1.0. Requires 1 megabyte, VideoWorks II, and HyperCard; hard-disk drive recommended. $99.95. MacroMind, 1028 West Wolfram, Chicago, IL 60657. NCP (Dec '88)

ORGANIZATIONAL TOOLS

Acta is an outline processor in desk accessory format. It has practi- ★★★★½ cally all the power of a stand-alone program, and then some. Can save files as Acta outlines, MacWrite files, or text files. Version 2.0. $79. Symmetry Corporation, 761 E. University Drive, Mesa, AZ 85203. NCP (Oct '88)

AEC Information Manager keeps track of projects from start to ★★½ finish. Has date calculations, scheduling graphs, and alarms. Version 1.21 reviewed. Requires 1 megabyte +. $695. AEC Management Systems, 20524 Amethyst Lane, Germantown, MD 20874. NCP (July '88)

Comment is an electronic version of Post-it Notes. A mini-word ★★★★ processor lets you attach notes to a spreadsheet cell, to words in a text document, or to a window on the desktop. Version 2.0. Requires 512KE. $99.95. Deneba Software, 3305 N.W. 74th Ave., Miami, FL 33122. NCP (Dec '88)

Design is a powerful organizational tool. It goes beyond mere flow- ★★★★½ charting. Graphically depicts relationships between systems. Complex, detailed program aimed at software pros. $250. Meta Software, 150 Cambridge Park Drive, Cambridge, MA 02140. NCP (Apr '88)

FamilyCare is a "yuppie" handbook to childhood diseases. The ★★★ rule-based expert system gives advice based on symptoms. Ailments and diseases run the gamut from acne and appendicits to wheezing and yeast infections. Lacks graphics. Version 1.0. Requires 512K. $99. Lundin Laboratories, 29451 Greenfield Road, Southfield, MI 48076. Mac II and MultiFinder friendly. NCP (Sept '88)

FlowMaster charts your ad dollars in print, TV, billboard, and other ★★★★★ mediums. Analyzes cost/benefit of a campaign in terms that even jaded Mad. Ave. execs will find innovative. Includes bar-chart and tabular output. Requires 512K+. $495. Select Micro Systems, 40 Triangle Center, Yorktown Heights, NY 10598. NCP (Jan '88)

GeoQuery puts your database on the map by accessing zip code ★★★★ information. Comes with maps of the U.S. Other atlases available. Version 1.0 reviewed. Requires 1 megabyte +



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and second disk drive. $349. Odesta, 4084 Commercial Avenue, Northbrook, IL 60062. NCP (July '88)

Guide ★★★★½ allows you to "cross reference" from within a document using hypertext. You can set up words or sections of the document so that double-clicking brings up explanatory material, graphics, and other useful items. The word processing and formatting functions, however, are limited. $135. OWL International, 14218 N.E. 21st St., Bellevue, WA 98007. NCP (Apr '87)

Inspiration ★★★ 's flowcharting tools let you free-associate ideas visually, then automatically dump the flowchart into a text outline. Version 1.0. Requires 512KE and an 800K drive or a hard-disk drive. $149. Ceres Software, 9498 S.W. Barbur Blvd., Suite 103, Portland, OR 97219. NCP (Dec '88)

Instant Expert ★★★½ is an excellent way to learn the mechanics of creating an expert system. The inference engine (that ultimately finds the answer) is visible. Lacks a true Mac interface. Version 1.0. $49.95. Human Intellect Systems, 1670 S. Amphlett Blvd., Suite 326, San Mateo, CA 94402. NCP (Jan '88)

MacProject ★★★ allows a user to plan and track a project from beginning to end. Uses CPM to produce schedules with start and finish dates for each task. Can report on resource interdependencies and generate all needed printed reports. $195. Claris, 440 Clyde Ave., Mountain View, CA 94043. NCP (Mar '86)

MacSMARTS ★★★ can create small, stand-alone expert systems. Features hypertext connections to Paint, PICT, SYLK, and text files. Still a little buggy. Version 1.03. Requires 512K+. $149.95. Cognition Technology, 55 Wheeler St., Cambridge, MA 02138. NCP (Jan '88)

Micro Planner Plus ★★★★½ is a great project-management system. Outstanding analysis capability. Memory based, making it much faster than the original. Includes a font menu. Even saves reports out in MacDraw format for further work. Uses standard print drivers. HFS compatible. $495. Micro Planning International, 235 Montgomery St., San Francisco, CA 94104. NCP (Dec '86)

Microsoft Works ★★★★½ is an integrated application that includes word processing, database, spreadsheet, and telecommunications functions. The telecommunications module includes both background up- and downloading. $295. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP (Oct '86) ★'86 Eddy

MORE ★★★★★ is an incredibly powerful outline processor with gobs of great features: instant charts, math capabilities, multiple windows, font and style control, templates, and more. Prints outlines in any of several standard formats, even in color. Requires 512K+. $395. Symantec, 117 Easy St., Mountain View, CA 94043. NCP (Jan '87) ★'86 Eddy

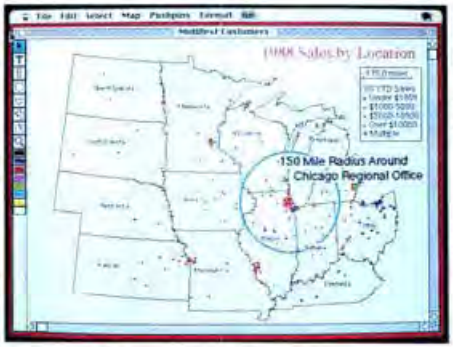
STELLA for Business ★★★★½ is a simulation tool used to model complex business systems. Requires that you master a discipline called "system dynamics." Requires 512K+. Mac II version available. $350. High Performance Systems, 13 Dartmouth College Highway, Lyme, NH 03768. NCP (June '88)

SuperExpert ★★½ is an expert system shell that induces rules from examples. Rules become unwieldy when many criteria and examples are used. Overpriced. Version 1.4 reviewed. Re-

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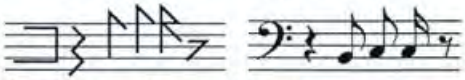


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quires 512KE. $199.95. Softsync, 162 Madision Avenue, New York, NY 10016. NCP (July '88)

UTILITIES

AutoSave DA is insurance against system crashes. It saves your work automatically at intervals from 1 to 99 minutes. Compatible with many applications, but not recommended for use with databases. $49.95. Magic Software, 1706 Galvin Road S., Bellevue, NE 68005. NCP (Jan '88)

CalendarMaker creates monthly calendars in a variety of formats. Users can incorporate their art and daily notes. Note files can be imported from a variety of DA calendars and outliners. Shareware and prelicensed versions available. $49.95. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Dec '86)

Capture saves any portion of a Macintosh screen to the Clipboard or as a PICT file. Works in color on the Mac II. Requires 512K+. MultiFinder friendly. $59.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (June '88)

Colorizer adds pigments to the desktop and black-and-white applications. Also colors PICT graphics. System resources include saving and printing color screens. A useful novelty that'll run its course as developers add color to apps. Requires Mac II. $49.95. Palomar Software, P.O. Box 2635, Vista, CA 92083. NCP (Jan '88)

Copy II Mac does efficient sector and bit copies and in its latest version can back up virtually all Mac software. Features graphic displays of copy progress. Comes with MacTools, a multi-use utility that can recover many damaged files. $39.95. Central Point Software, 9700 S.W. Capitol Highway, Portland, OR 97219. NCP (Apr '86) ★'85 Eddy

DiskExpress unfragments disk volumes by reorganizing data into continuous sectors and arranging files to slow down further fragmentation. Works with MacServe, floppy drives, and most hard drives. Requires 512K+. $39.95. ALSoft, Box 927, Spring, TX 77383. NCP (Feb '87)

DiskFIt is a utility for backing up and restoring hard disk files. Creates a "SmartSet" of floppy disks so incremental back-ups only update files modified since the last back-up procedure. Backs up to floppies or another hard disk. Requires 512KE+. $99.95. SuperMac Software, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (June '87)

DiskQuick is an easy-to-use cataloging program. Criteria selection option for generating subcatalogs. Requires 512K+. $49.95. Ideaforms, P.O. Box 1540, Fairfield, IA 52556. NCP (Apr '87)

Disk Ranger is a speedy cataloging program that doubles as an efficient labelmaker. Comes with pinfeed labels. Works with regular and hard disks. Can catalog HFS systems. $34.95. Graham Software, 8609 Ingalls Circle, Arvada, CO 80003. NCP (Mar '86)

DiskTools Plus is a set of eight useful DAs and applications. Earlier version was sold as Battery Pak. The DA Disk Tools II is a Finder replacement. Also included are an RPN calculator, Phone Pad, and Calendar Manager. Requires 512K+. $49.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Mar '88)

We tear up the competition on both price and quality



Hardware House, Inc., introduces **MAX**, a new series of 40 and 80mb hard drives for the MAC SE and MAC II, utilizing state-of-the-art 3½" mechanisms from QUANTUM.

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DiskTop is a desk accessory Finder replacement of extraordinary ★★★★½ power and ease of use. Comes with the useful LaserStatus DA and Widgets application. The extras alone are worth the price. Requires 512K+. Upgrade from version 1.0, $7; $10 with new manual. $49.95. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Aug '87)

Dubl-Click Calculator Construction Set lets users design personalized calculators with a variety of standard and special functions. Finished calculators can be saved as installable desk accessories or as clickable applications. $59. Dubl-Click Software, 18201 Gresham St., Northridge, CA 91325. NCP (Apr '86)

Eureka: The Solver is a free-form numerical equation solver. Standard trigonometric and logarithmic functions are available, as is treatment of imaginary and complex numbers. $195. Borland International, 4585 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Mar '88)

Fastback for the Macintosh is hard disk back-up software that is very quick, if not very efficient. Doesn't automatically exclude applications. Creates a separate catalog disk. $99.95. Fifth Generation Systems, 1322 Bell Ave., Tustin, CA 92680. NCP (Apr '88)

FedIt Plus is the file and disk editor for everyone, from newest Mac owner to oldest. It can do more for your disks and files than any other application. Can recover deleted MFS files. If you own a Mac, get it. HFS-compatible. $49.95. MacMaster Systems, 108 E. Fremont Ave., #37, Sunnyvale, CA 94087. NCP (Sept '86) ★'86 Eddy

Findswell is an indispensible utility that installs a new button in the Open Dialog box of virtually every Macintosh application. Press the button, type a search string, press Find, and Findswell searches for any files that match. Click Open or double-click to open the correct file. Requires 512K+. $49.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95060. NCP (Nov '87) ★'87 Eddy

1stAid Kit HFS recovers lost or damaged files from floppy or hard disks. An excellent manual-turned-textbook actually teaches the Hierarchical File System. Requires 1 megabyte +. Version 2.2 reviewed. $99.95. 1st Aid Software, 42 Radnor Road, Boston, MA 02135. NCP (June '88)

FlashBack is a utility to back up HFS hard disks onto floppies. A unique graphic display of the HFS directory facilitates file selection. The program can handle files larger than 800K. $59.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Nov '86)

Font/DA Juggler Plus gives you unlimited access to almost any number of fonts, desk accessories, and sounds. Uses hierarchical menus. $59.95. ALSoft, P.O. Box 927, Spring, TX 77383. NCP (May '88)

Glue adds a print-to-disk capability to many programs. ImageSaver installs as printer driver; Viewer allows copying and printing of Glue files. Handy utility for desktop publishers. $59.95. Solutions International, P.O. Box 989, Montpelier, VT 05602. NCP (Dec '86)

Hard Disk Util uses patch files to allow users to mount and run specified programs on their hard disks. The list of patches is constantly expanding. $89.95. FWB Software, 2040 Polk St., San Francisco, CA 94109. NCP

HFS Backup ranks as one of the preferred hard disk back-up utilities. Back up by file/folder or last changes. Back-up specifications can be saved as templates. Good graphic interface. Reliable program. $49.95. PCPC, 4710 Eisenhower Blvd., Tampa, FL 33634. NCP (Dec '86)

HFS Locator Plus is *the* essential HFS desk accessory. It can search for a file by name or date of creation, create folders, move files from one folder to another, set a program to launch while in an application. $39.95. PBI Software, 1163 Triton Drive, Foster City, CA 94404. NCP (Sept '86)

Icon-It! lets you create icons to use as an alternative to menu commands. Comes with 47 icon templates or you can create your own. Version 1.0. $79.95. Olduvai Software, 7520 Red Road, South Miami, FL 33143. NCP (Feb '88)

LabView is a graphical programming environment that creates "virtual instruments" to perform calculations, acquire laboratory data, and control instrumentation. Slow. Version 1.1 reviewed. $1900. National Instruments, 12109 Technology Blvd., Austin, TX 78727-6204. NCP (July '88)

LaserServe is a printer spooler for AppleTalk networks. After installation all operations are done via a desk accessory. Works with both MacServe and TOPS. Requires 512K+ and 800K drive or hard disk. $95 per node. Infosphere, 4730 S.W. Macadam Ave., Portland, OR 97201. NCP (Feb '87)

Mac Disk Catalog II is a utility that will quickly organize a moderate-size disk library. Easy to use with powerful reporting and label-making features. $49.95. New Canaan MicroCode, 136 Beech Road, New Canaan, CT 06840. NCP (Dec '85)

MacEZ-Mill is a CAM program that controls industrial milling machines. Quickly writes part programs that previously only very experienced designers could execute. $6000. Bridgeport Machines, 500 Lindley St., Bridgeport, CT 06606. CP (July '88)

MacFlow is a design tool created for programmers. Traditional flowcharting symbols are linked together, and a symbol can be connected to a separate flowchart file. Now supports custom symbols. $125. Mainstay, 5211-B Derry Ave., Agoura Hills, CA 91301. NCP (Apr '87)

MacInUse tracks time spent in applications and saves info as text files. Installs on any disk, works in background. MFS, HFS compatible. Extremely valuable for tax purposes, client records, etc. $79. SoftView, 4820 Adohr Lane, Camarillo, CA 93010. NCP (Jan '87) ★'86 Eddy

MacLabeler lets users instantly index and print labels for all the disks in a burgeoning collection. Choose border type and orientation of your label; index by folder or document. Starter set of labels is included. $49.95. Ideaform, P.O. Box 1540, Fairfield, IA 52556. NCP (Prem)

MacNosy is a global disassembler. A very advanced user can use this program to look into the code of virtually any program. This advanced tool can take you places no other Mac program could dream of going IF you have the skill to guide it. The documentation is sparse. For pros only. $90. Jasik Designs, 343 Trenton Way, Menlo Park, CA 94025. NCP

MacSafe is a data file security program that allows you to place multiple files into a "safe," and then you can further protect them through two types of encryption (including DES). Flexible and very easy to use. Allows for installation on hard disk. $149.95. Kent Marsh Ltd., 1200 Post Oak Blvd., Houston, TX 77056. CP (Mar '87)

MacServe converts a Mac and a hard disk into a disk and print server. Uses the AppleTalk network and is easily hooked up. Users can partition the hard disk into multiple volumes. Runs in the background, so users can work on all machines in the network. $250. Requires 512+. Infosphere, 4730 S.W. Macadam, Portland, OR 97201. CP

MacTree displays your files in the form of a hierarchical tree. Good idea, poor performance. Can't view tree easily. Good search function. Requires 512K+. $69.95. Software Research Technology, 22901 Mill Creek Drive, Laguna Hills, CA 92653. NCP (Apr '88)

MacZap is a three-part disk and memory utility. It can be used to recover some damaged files and disks, compare disks, analyze disk structure, and make back-up copies of most disks. $60. Micro Analyst, 2505 Roxmoor, Austin, TX 78723. NCP (Jan '86)

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MINIFINDERS

Menu Fonts displays the names of fonts in the actual font instead of
♦♦♦ standard Chicago. Won't work with programs that have a nonstandard Font menu or no Font menu. Comes with Lock-Out, a utility that gives password access to your Mac, and FastFormatter, a utility for formatting multiple blank disks. Requires 512K+. $15. Beyond Software, 6069 E. Grant Road, Tucson, AZ 85712. NCP (July '87)

MockPackage + is a set of extremely powerful DAs. Includes a text
♦♦♦♦½ editor, text printer (supports LaserWriter), charter, terminal, and EZmenus. HFS compatible. $35. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Mar '87)

myDiskLabeler is an excellent label maker. It can read directories
♦♦♦♦ and use large or small icons or anything desired. Comes with 54 precut labels. $44.95; with color printing ability (on the ImageWriter II), $54.95; with PostScript font capability (on the LaserWriter), $64.95. Williams and Macias, P.O. Box 19206, Spokane, WA 99219. NCP (Aug '87)

'Ncryptor is a simple, safe program that lets users password-pro-
♦♦♦♦ tect their files. The same program is used for encoding and decoding. This is one of the best products in its category. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP

NightWatch locks up your hard disk by using a floppy start-up disk
♦♦♦♦½ that acts as a key. Type in the correct password, and access to the hard disk is allowed. Version 1.02. Requires 512KE, a hard disk, and an 800K drive. Mac II and MultiFinder friendly. $149.95. Kent Marsh Ltd., P.O. Box 460289, 1200 Post Oak Blvd., Suite 210, Houston, TX 77056. NCP (Sept '88)

On Cue lets you switch applications without returning to the Finder.
♦♦♦♦½ Under MultiFinder, active applications are listed on a pop-up menu. Can also launch directly to a specific document. Version 1.0. Requires 512K. Mac II and MultiFinder friendly. $59.95. ICOM Simulations, 648 South Wheeling Road, Wheeling, IL 60090. NCP (Sept '88)

PowerStation is an extremely easy-to-use, versatile and powerful
♦♦♦♦♦ Finder substitute. Loaded with powerful features. Comes with Pyro! $59.95. Fifth Generation, 1322 Bell Ave., Tustin, CA 92680. NCP (Dec '87)

Printworks for the Mac is a comprehensive software-based dot-
♦♦♦♦ matrix printer control system. Optimizes printing from different applications, and easy to use. Requires 512K+. $75. SoftStyle, 7192 Kalanianaole Highway, Honolulu, HI 96825. NCP (Aug '87)

Programmer's On-line Companion puts an abridged version of
♦♦♦ *Inside Macintosh* in your system for reference. Simply read the text or transfer some or all of it directly into your normal editing window. Non-Mac-ish interface makes the program confusing, somewhat difficult to use. $34.95. Addison-Wesley, Route 128, Reading, MA 01867. NCP (July '87)

Quick & Dirty Utilities, Volume One is a disk full of handy pro-
♦♦♦♦½ grams. Several desk accessories include a menu bar clock and a terminal emulator. $39.95. Dreams of the Phoenix, P.O. Box 10273, Jacksonville, FL 32247. NCP (Nov '85) ★'85 Eddy

QuicKeys lets you make full use of your keyboard. Assign any com-
♦♦♦♦ mand (menu choices, DAs, etc.) or series of text blocks and/or command to any key or key combination. Enormously powerful; necessary for Apple Extended Keyboard owners. Requires 512K+. $99.95. CE Software, 1854 Fuller Road, West Des Moines, IA 50265. NCP (Jan '88) ★'87 Eddy

RamSnap is a RAMdisk and disk cache in one easy-to-use pack-
♦♦♦♦ age. Can store multiple configurations as files. Good product but a little pricey. $30. Dove Computer Corp., 1200 North 23rd St., Wilmington, NC 28405. NCP (June '87)

Read-It! is the best consumer value in optical character recognition
♦♦♦♦ software. Works with any scanner that saves images as a bit map, PICT or TIFF file. Comes with type tables that can be customized. Version 1.1. $395; ThunderScan version, $149.95. Olduvai Software, 7520 Red Road, South Miami, FL 33143. NCP (Apr '88)

Sentinel encrypts data files (or sets of files) using a super-secure
♦♦♦♦ DES or a super-fast SuperCrypt algorithm. Provides high-level security if you can keep your passwords secret. Requires 512KE. $295. SuperMac, 295 N. Bernardo Ave., Mountain View, CA 94043. NCP (Apr '88)

Smart Alarms is the best reminder system for the Mac. Easy to use,
♦♦♦♦½ versatile, and, well, smart. This self-running DA automatically reminds you of anything you enter into its Reminder file, giving you a wide range of useful advance warning options. $49.95. Imagine Software, 19 Bolinas Road, Fairfax, CA 94930. NCP (Oct '86)

SmartScrap and The Clipper are two useful desk accessory utili-
♦♦♦♦½ ties for graphics work. SmartScrap is a major enhancement to the standard Scrapbook DA. The Clipper provides you with a transparent Clipboard window, allowing you to resize or crop a graphic to the area that it will be pasted to. $59.95. Solutions International, P.O. Box 989, Montpelier, VT 05602. NCP (July '87) ★'87 Eddy

SoundWave is a useful sound recording and editing utility. Works
♦♦♦♦ with waveforms; able to change sampling rates. Previously known as SoundCap. $199.95. Impulse, 6870 Shingle Creek Parkway, Minneapolis, MN 55430. NCP (Apr '88)

Stepping Out II is a software alternative to a large-screen monitor.
♦♦♦♦♦ Lets you create a virtual screen (as large as memory allows) inside the Mac's 9-inch screen. Automatically scrolls to new document position as you type or draw. Version 2.0. Requires 1 megabyte. $95. Berkeley System Design, 1700 Shattuck Ave., Berkeley, CA 94709. NCP (Oct '88)

StuffIt compresses files to reduce the amount of space they take
♦♦♦♦♦ up on disk. Great for transferring documents via modem. Also joins and encrypts files. Version 1.5. Requires 512KE. Shareware fee, $18. Raymond Lau, 100-04 70 Ave., Forest Hills, NY 11375-5133; also available on most electronic services. NCP (Dec '88)

Suitcase is a transparent program that automatically lets you use
♦♦♦♦♦ all your fonts and DAs. Foolproof and indispensible. Comes with Pyro!, the best screen saver. Requires 512K+. $59.95. Fifth Generation, 1322 Bell Ave., Tustin, CA 92680. NCP (Nov '87) ★'87 Eddy

SuperLaserSpool is a LaserWriter spooler. Very fast because it
♦♦♦♦ does conversion to PostScript in the background, but doesn't print a faithful rendition of PageMaker documents as a result. $149.95 single user, $395.95 for up to five users on one network. SuperMac Software, 950 N. Rengstorff Ave., Mountain View, CA 94043. NCP (June '87)

Switcher is Andy Hertzfeld's contribution to Mac productivity. This
♦♦♦♦♦ program lets users run several programs at once (up to eight on a 1-megabyte or larger machine). Switching between the programs is nearly instantaneous. Requires 512K+. $19.95 from Apple, free from BBSs, included with some third-party applications. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP (June '86)

Symantec Utilities for Macintosh (or SUM) reduces worries about
♦♦♦♦♦ losing data. It prevents, diagnoses, and if required, fixes many serious disk and file problems. Recovers lost files on crashed hard disks. Version 1.0. Requires 512KE. $99.95. Symantec, 10201 Torre Ave., Cupertino, CA 95014. NCP (Sept '88)

Tempo II is a powerful keyboard macro program that gives owners of
♦♦♦♦½ extended keyboards their money's worth. Especially good for building sequential macros. Features include conditional branching and the ability to remember menu selections by name. Version 1.0. $149.95. Affinity Microsystems, Ltd.,

MINIFINDERS

1050 Walnut St., Suite 425, Boulder, CO 80302. NCP (Dec '88)

Top Desk is a set of seven self-installing (and self-removing) DAs. ♦♦♦♦½ Menu Key adds Command key sequences to programs; View allows looking at and moving data between up to eight MacWrite documents; also included are BackPrint, Touch 'n' Go, Blank, Encrypt, and Launch. $59.95. Cortland Computer, P.O. Box 9916, Berkeley, CA 94709. NCP (May '86) ★'86 Eddy

TMON is the debugger for the Mac. This isn't open to question. ♦♦♦♦♦ TMON is simply the best. Comes with the latest version of Darin Adler's Extended User Area. $149. ICOM Simulations, 626 Wheeling Road, Wheeling, IL 60090. NCP

Turbo Download is a desk accessory designed specifically to in- ♦♦♦♦½ crease the speed of Xmodem data transfers from national databases to your Mac. Speed increases range upward from 50 percent to over 300 percent at 2400 baud. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP

Twelve-C Financial Desk Accessory brings all the power and func- ♦♦♦♦ tionality of a Hewlett-Packard 12C programmable calculator to your desktop. Can be programmed and all registers can be viewed while calculator is running. $49.95. Positive Works, 142 Cone Road, Ormond Beach, FL 32074. NCP

TypeNow is a desk accessory that allows the Mac and ImageWriter ♦♦♦♦ to function as an electronic typewriter. Type can be placed into blanks in complex forms easily. Typing can be recorded and played back. $39.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (Jan '86)

WorksPlus Command lets you build and define macros for all ♦♦♦♦ Works modules. Predefined macros provide for an even tighter integration of the program's word-processing, spreadsheet, and database modules. Requires 1 megabyte +. $99.95. Lundeen & Associates, P.O. Box 30038, Oakland, CA 940604. NCP (May '88)

LANGUAGES

AAIS Prolog is a fast standard Prolog with excellent debugging and ♦♦♦♦ error handling. Good for serious program development. Documentation is not as good as the program. $150. Advanced AI Systems, P.O. Box 39-0360, Mountain View, CA 94039-0360. NCP (Mar '87)

Allegro Common LISP's development environment is a full EMACS ♦♦♦♦♦ style editor called FRED that implements most Common LISP editing and debugging functions. Version 1.2. Requires 1 megabyte and a hard drive. $600. Coral Software, P.O. Box 307, Cambridge, MA 02142. NCP (Nov '88)

Aztec C is a C language that will appeal to users with a UNIX ♦♦♦♦ background. It uses many UNIX conventions and in the more expensive versions comes with standard UNIX utilities, including the VI editor. $75 beginners, $199 basic system, $299 development system, $499 commercial system. Manx Software Systems, P.O. Box 55, Shrewsbury, NJ 07701. NCP (May '86)

Basic Compiler is the long-awaited compiler for Microsoft BASIC. ♦♦♦½ The interface is unfriendly, but it gets the job done. Compiled programs run faster, but you can still tell they are written in BASIC. $195. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP (May '87)

ExperCommon Lisp is a LISP development system. Not fully Com- ♦♦♦ mon LISP compatible, but creates good compiled code and stand-alone applications. Requires 1 megabyte +. $995. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108. NCP (Aug '87)

ExperLISP is a useful programming language for high-level pro- ♦♦♦ grammers. The more you use it, the more you'll figure out about it. $495. Requires 512K+. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108. CP

ExperLogo is a version of the popular teaching language, Logo. ♦♦♦ Features three-dimensional graphics using "bunnies" rather than the usual "turtles." Very speedy, smooth program. Comes with an excellent manual. $149.95. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108. CP

ExperProlog II is a Prolog based on the new Prolog II standard. Has ♦♦♦ the ability to handle infinite trees and allows user-defined functions that operate conditionally. Documentation is not the best and Mac interface is nonstandard. $495. ExperTelligence, 559 San Ysidro Road, Santa Barbara, CA 93108. NCP (Mar '87)

Lightspeed C provides an integrated environment for developing ♦♦♦♦½ desk accessories, applications, and code resources in C. The editor works with the compiler for searches and file management. Can get awkward if you need something outside the environment. $175. Think Technologies, 135 South Road, Bedford, MA 01730. NCP (Apr '87)

Lightspeed Pascal is a fast, powerful development system for ♦♦♦♦♦ Pascal programming. Fully integrated Mac-like environment. Requires 512K+. $125. Think Technologies, 135 South Road, Bedford, MA 01730. NCP (Feb '87)

LPA MacProlog is a much improved program that includes incre- ♦♦♦♦ mental and optimizing compilers, a graphics environment package, and C and Pascal submodules. Version 2.0. Requires 1 megabyte +. $495. Programming Logic Systems, 31 Crescent Drive, Milford, CT 06460. NCP (Feb '88)

MacAsm is a software development system that allows programs ♦♦♦ to be written in assembly language. Programmers can assemble, edit, and test software, and an integrated resource compiler lets independent applications run from their own icons. $125. Mainstay, 5311-B Derry Road, Agoura Hills, CA 91301. NCP

Mac C is a good, highly Mac-oriented implementation of this popu- ♦♦♦♦ lar development language. Assembler and linker included. $425. Consulair, 140 Campo Drive, Portola Valley, CA 94025. NCP ★'85 Eddy

MacExpress is a development environment or shell. Programmers ♦♦♦ use it to save time and effort when developing stand-alone applications for the Mac. $195. ALSoft, P.O. Box 927, Spring, TX 77383. NCP (Feb '86)

MacForth Plus is an excellent implementation of the popular Forth ♦♦♦♦ programming language. New, reduced price; $199. Creative Solutions, 4701 Randolph Road, Rockville, MD 20852. NCP

Mach II is a multitasking implementation of Forth that allows local ♦♦♦♦ variables and text files. Can create stand-alone applications. Several windows can be up with different operations in each, operating concurrently. Execution is fast. $99.95. Requires 512K+. Palo Alto Shipping, P.O. Box 7430, Menlo Park, CA 94026. NCP (Apr '86)

Macintosh 68000 Development System is a fairly traditional as- ♦♦♦♦ sembly language package. The two-disk set provides an editor (Edit), an assembler, a linker, an executive, and a resource compiler. $195. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. NCP

Macintosh Pascal is Apple Computer's version of this very popular ♦♦♦ programming language. Loaded as it is with innovative teaching features, this interpreter is an excellent introduction to Pascal. $125. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. CP

MacScheme is a LISP dialect with "artificial intelligence" capabili- ♦♦♦ ties. Has a large appetite for RAM. Interpreted language with Toolbox access limited to a small part of QuickDraw. $125. Semantic Microsystems, 4470 S.W. Hall St., Beaverton, OR 97005. NCP (June '86)

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MINIFINDERS

MacScheme+Toolsmith is a Mac version of Scheme, a LISP dialect. Beautiful implementation, marred only by relative slowness compared to similar products. Get Toolsmith. Requires 1 megabyte +. $395. Semantic Microsystems, 4470 S.W. Hall, Beaverton, OR 97005. NCP (Aug '87) ♦♦♦♦♦

Megamax C is an easy-to-use, full version of C. Has a compiler, linker, disassembler, editor, and much more. Good for beginners. Excellent documentation. $299.95. Megamax, P.O. Box 851521, Richardson, TX 75085. NCP ♦♦♦♦

Microsoft BASIC was the Mac's first programming language. This interpreter (it's not a compiler) now supports the Toolbox and the whole Mac interface can be implemented in your programs. For nonprogrammers, there are lots of programs available. $99. Microsoft, 16011 N.E. 36th Way, Redmond, WA 98073-9717. NCP ★'85 Eddy ♦♦♦♦

MIDIBasic is a library of simple, but highly useful routines for writing MIDI software. Good stuff. Sketchy documentation. Works with both Microsoft and ZBasic. Requires 512K+ plus BASIC. $49.95. Altech Systems, 831 Kings Highway, Shreveport, LA 71119. NCP (Aug '87) ♦♦♦♦

Object Logo is an object-oriented programming language with access to the Toolbox. Good product, but can't produce standalone applications. Requires 512K+. $79.95. Coral Software, P.O. Box 307, Cambridge, MA 02142. NCP (Aug '87) ♦♦♦♦

Personal Prolog is an inexpensive and well-documented program. Has no debugging or search and replace facilities, making it a more appropriate tool for learning than development. Documentation and use of Mac interface are excellent. $64.95. Optimized Systems Software, 1221 B Kentwood Ave., San Jose, CA 95129. NCP (Mar '87) ♦♦♦♦

Prolog/m is a solid Prolog following the Edinburgh standard. Has extensive debugging facilities, but you'll need a separate Toolbox disk with 58 additional predicates. Drawback: no true editing or printing facilities. $99.95. Chalcedony Software, 5580 La Jolla Blvd., La Jolla, CA 92037. NCP (Mar '87) ♦♦♦♦

QUED (Quality Editor for Developers) is the ultimate source code editor. Loaded with useful and well-thought-out features, it will make any programmer's life much easier. It is not a word processor, however. $65. Paragon Concepts, 4954 Sun Valley Road, Del Mar, CA 92014. NCP (Mar '86) ♦♦♦♦

TML Data Base Toolkit is an ISAM type database that provides fast and efficient administration of large data files in applications developed with TML compiler. Supports multiple open index files. $89.95. TML Systems, 4241 Bay Meadows Road, Jacksonville, FL 32217. NCP (Dec '86) ♦♦♦♦

TML (MacLanguage Series) Pascal is a good Pascal compiler, capable of producing stand-alone programs. Can use most existing Lisa Pascal programs with only slight modification. Requires 512K+. $99.95. TML Systems, 4241 Bay Meadows Road, Jacksonville, FL 32217. NCP (June '86) ★'86 Eddy ♦♦♦♦♦

TML Source Code Library shows how to write programs that use custom definition routines, speech, serial drivers, split bars, and other topics. Provided on three 400K diskettes. Requires TML Pascal. $79.95. TML Systems, 4241 Bay Meadows Road, Jacksonville, FL 32217. NCP (Dec '86) ♦♦♦♦½

Visual Interactive Programming is a unique visual programming system for creating simple Macintosh applications. Programs are constructed in a flowchart-type manner. Easy access to most toolbox routines. $149.95. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301. NCP (June '87) ♦♦♦♦

ZBasic is a fast, interactive compiler capable of creating standalone applications that take advantage of Mac's unique features and abilities. Includes Edit, RMaker and MacInTalk. Requires 512K+. $89.95. Zedcor, 4500 E. Speedway Blvd., Tucson, AZ 85712. NCP (Dec '86) ♦♦♦♦

EDUCATION

Alphabet Blocks teaches prereaders the letters and sounds of the alphabet. The digitized voice of an on-screen elf is clear and pleasant. Very intuitive. Requires 1 megabyte +. $59.95. Bright Star Technology, 14450 N.E. 29th Place, Bellevue, WA 98007. NCP (May '88) ♦♦♦♦♦

American Discovery is an interactive United States geography game that teaches states, capitals, and, in a roundabout manner, postal codes. Suffers from small maps. Requires 512K+. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (May '88) ♦♦♦

Business Simulator is a training tool in a simulation game. Make decisions that manage the company through several stages over 25 years. Decisions become more difficult over time. Requires 1 megabyte +, two disk drives (one must be 800K). May be run from a hard disk. $69.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Dec '87) ♦♦♦♦

ChipWits is a combination game and teaching tool. Players create programs to maneuver robots through a set of eight mazes. The programs are written in ChipWit's built-in icon-based programming language (IBOL). $49.95. BrainPower, 24009 Ventura Blvd., Calabasas, CA 91302. NCP ★'85 Eddy ♦♦♦½

Course Builder creates stand-alone educational applications. An easy-to-learn dedicated programming language uses blocks and arrows. Graphics, animation and sound can be integrated. Version 2.0 allows mathematical calculations. Poor documentation. $395, plus $10 shipping. TeleRobotics International, 8410 Oak Ridge Highway, Knoxville, TN 37931. NCP (Oct '87) ♦♦♦♦

KidsTime is a package of five quality educational programs for children between the ages of 3 and 12. The programs all have adjustable difficulty levels. Some use speech and one is a nice introduction to musical notes. Sparse documentation. $49.95. Great Wave, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Oct '86) ★'86 Eddy ♦♦♦♦

LearnWord 3.0 is a three-part series of cassette tape/diskette modules that explain the intricacies of Word 3.0. They do the job, but remind you why cutting classes was more fun. $49.95 per module. Personal Training Systems, P.O. Box 54240, San Jose, CA 95154. (Apr '88) ♦♦♦½

LXR•Test generates tests from a database of questions. Makes it easy to modify and scramble test questions. Flexible output. Requires Mac 512KE+, two 800K drives, or a hard-disk drive. $199 or $399, depending on features. Logic eXtension Resources, 9651 Business Center Drive, Rancho Cucamonga, CA 91730. NCP (May '88) ♦♦♦♦

MacType offers structured typing instruction. Can teach both standard and Dvorak keyboards. Features include certificates for reaching certain levels. Can be used in a multistudent environment. $49.95. Palantir Software, 12777 Jones Road, Houston, TX 77070. CP ♦♦♦♦

MasterType is proof that learning to type can be fun. In this arcade-style action game words descend from four corners towards the center ship; the user must type them correctly. Features 18 skill levels, tracks errors, recommends lessons and provides comparison scores. $49.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. CP ♦♦♦

On Becoming a Desktop Publisher is a video training tape based largely on the syndicated television program, "The Computer show." Good primer on the fundamentals of DTP products. Will eventually become dated. Requires Beta or VHS VCR. $49.95. Ocean Communications, 1641 North First St., Suite 160, San Jose, CA 95112. (Sept '88) ♦♦♦♦

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MINIFINDERS

Practica Musica uses an interactive game and practice approach ♩♩♩♩ to teach music theory and ear training. Excellent training tool for the serious music student, it is also fun for anyone who wants to develop a trained ear for intervals, chords, and melodies. Requires 512K+. $125. ARS Nova Software, P.O. Box 40629, Santa Barbara, CA 93140. NCP (Nov '87) ★'87 Eddy

Reader Rabbit teaches 4-to-8-year olds how to read in four elegant ♩♩♩♩♩ games that play and build off of each other. Requires 512KE + and an 800K drive. Mac II and MultiFinder hostile. Version 2.0 reviewed. $59.95. The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555. CP (June '88)

Sensei Physics is a capable, intelligent, well-designed study aid. ♩♩♩♩½ Covers Vectors to Thermodynamics to The Nature of Light. Animated experiments let you try out concepts. Requires 512K+. $99.95. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. CP (Jan '88)

Subli-Mac is a self-hypnosis program, combining subliminal, relax- ♩♩½ ation, and positive-self-image techniques. Flashes a brief user-written message (against a diversionary pattern) at your subconscious. Dangerous near hard disks. Manual suffers from terminal California-ese. $39.95. Psy-Den, P.O. Box 248, Champlain, NY 12919. NCP (Jan '88)

Type! is a typing tutorial that is both practical and flashy. It allows ♩♩♩♩½ users to interrupt and move easily between functions; however, use of the Return key or space bar are assumed but never explained. Version 1.0. Requires 512K. $49.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903-2101. NCP (Nov '88)

Typing Instructor Encore recognizes that it's being used on a word ♩♩♩♩ processor. While it is easy to control, there are some strange bugs in the program. Requires 512K. $49.95. INDIVIDUAL Software, 125 Shoreway Road, Suite 3000, San Carlos, CA 94070-2704. NCP (Nov '88)

Typing Tutor IV consistently tests your use of all keys, including ♩♩♩ seldom-used ones. It's hard to maintain user's attention span, as the testing material is unimaginative. Requires 512K. $49.95. Simon & Schuster, One Gulf and Western Plaza, New York, NY 10023. NCP (Nov '88)

ENTERTAINMENT

A Mind Forever Voyaging is a departure in text adventure games. It ♩♩♩ has a more extensive vocabulary and a more involved story than most of the genre. The story here is gripping, but there are only a few puzzles to solve. Requires 512K+. $39.95. Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140. NCP (Apr '86)

The Ancient Art of War gives users a chance to refight some ♩♩♩♩½ famous campaigns on both strategic and tactical levels. Campaigns can also be designed from scratch. Very playable, addicting game. Requires 512K+ Mac. $44.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. CP (Apr '86)

Apache Strike would have been an excellent arcade game in the ♩♩ late '70s. Now, it's passe. Navigate a helicopter to destroy ever-increasing numbers of enemy aircraft and tanks. Mac II hostile. Requires 512K+. $49.95. Silicon Beach Software, P.O. Box 261430, San Diego, CA 92126. NCP (July '88)

Balance of Power is the world's first computer peacegame. This ♩♩♩♩♩ simulation allows players to become either the President of the United States or General Secretary of the Soviet Union. Extraordinary artificial intelligence routines and general play make this a classic. $49.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60022. CP (Prem)

Battle Stations is a deceptively simple game based on the pen and ♩♩♩♩ paper game of Battleship. Requires strategy on several levels. Makes excellent use of Mac sound and graphics. Fun, casual game, especially when the Mac is one of the players. Requires 512K+. $30. Timeline, P.O. Box 60, Ypsilanti, MI 48197. NCP (June '87)

Beyond Dark Castle brings back Prince Duncan in an encore per- ♩♩♩½ formance to run, jump, and beat his way to victory. But really, just more of the same. Requires 512KE. $49.95, Silicon Beach Software, P.O. Box 261430, San Diego, CA 92126. NCP (Aug '88)

Beyond Zork is yet another installment in the famous Zork series of ♩♩♩♩½ text adventures. Find the fabled Coconut of Quendor to restore failing magic in this expert-level game. On-screen mapping and the Mac's window environment are utilized. $49.95. Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140. NCP (Apr '88)

Borrowed Time casts players as detectives who have to solve their ♩♩♩♩ own murder — before it happens. This game requires players to think and act like a detective to solve the game. Good sentence parser, sketchy Mac interface. $44.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. CP (May '86)

The Chessmaster 2000 is a masterful chess program that will ♩♩♩♩♩ appeal to both novice and master. You can view the board from 2-D or 3-D perspective and turn the board for a better look. Play is smooth and easy, and the program responds by voice. You may get tired of hearing "Gotcha," though. $39.95. The Software Toolworks, 13557 Ventura Blvd., Sherman Oaks, CA 91423. CP (July '87)

Chuck Yeager's Advanced Flight Trainer doesn't quite have the ♩♩ right stuff to hold interest for long. Simplistic controls. Lacks features found in versions for other computers. Verison 1.0. Requires 512KE and two 800K disk drives. $49.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. NCP (Nov '88)

Crystal Quest combines all the good elements of nearly every video ♩♩♩♩½ game ever made. Move a piece around to gobble up points and crystals. Shoot the nasties and get through the goal before they get you. Excellent sound effects. In color on the Mac II. Requires 512K+. Greene, 15 Via Chualar, Monterey, CA 93940. CP (Apr '88)

Dark Castle is an outstanding achievement in action games which ♩♩♩♩♩ integrates RealSound with superb animation and graphics. You'll need better-than-average hand/eye coordination, but it's well worth the effort. Requires 512K+. $39.95. Silicon Beach Software, P.O. Box 261430, San Diego, CA 92126. NCP (Apr '87) ★'87 Eddy

Deja Vu: A Nightmare Comes True is a graphic adventure that ♩♩♩♩♩ breaks new ground. Innovative use of the Mac interface in a truly playable and exciting game. A great introduction to graphic adventure games. $49.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. CP (Jan '86) ★'85 Eddy

Dinner at Eight is a useful recipe-filing system that includes a ♩♩♩♩ collection of recipes from a nationwide sampling of restaurants. Users enter number of diners and program scales recipes. $49.95. Rubicon, 2111 Dickson Drive, Austin, TX 78704. NCP (Jan '86)

Down Hill Racer is an action game with three skier personalities, ♩♩♩♩ four courses and four skill levels. There's something here for every player, no matter how bad or good. Full digitized sound (very nice!). $49.95. Miles Computing, 7741 Alabama Ave., Canoga Park, CA 91304. CP (Sept '87)

Falcon simulates an F-16 fighter jet with gut-tightening, sweat- ♩♩♩♩½ making realism. Go against MiGs and dodge SAMs scenarios. Requires 1 megabyte +. $49.95. Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501. NCP (May '88)

Ferrari Grand Prix is an exciting race car simulation game. Master- ♩♩♩♩ ing it takes quite a bit of time and effort. Startup course and four other courses are built into the program. You can also design your own courses and backgrounds. Requires 512K+. $59.95. Bullseye Software, P.O. Drawer 7900, Incline Village, NV 89450. CP (July '87)

MINIFINDERS

Fool's Errand is an outstanding collection of 80 puzzles woven ★★★★★ around a mythical theme of an evil priestess and the search for wisdom. Requires 512K+. $49.95. Miles Computing, 7741 Alabama Ave., Canoga Park, CA 91304. NCP (July '88)

Gato puts players in command of an American submarine in World ★★★★½ War II. This superb simulation game uses all of the Mac's graphic capabilities to really make you feel that "you are there." $49.95. Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501. CP (Nov '85)

GO is the Chinese equivalent of chess. Players plonk markers on a ★★★½ grid to gain territory and outwit an opponent or the computer. Requires 512K+. Mac II hostile; MultiFinder friendly. Version 1.0 reviewed. $49.95. Infinity Software, 1144 65th St., Studio C, Emeryville, CA 94608. NCP (June '88)

Handwriting Analyst produces a personality profile based on an- ★★★★½ swers to questions about one's handwriting. It's simple and the results will amaze and astound. $49.95. Ciasa, 2017 Cedar St., Berkeley, CA 94709. NCP (Apr '88)

Hollywood Hijinx substitutes a modern Hollywood estate for the ★★★★ famous Underground Empire, but otherwise represents a return to Zork gameplay and feel. There's even a maze to navigate. Simplistic, but good. $39.95. Infocom, 15 Cambridge Park Drive, Cambridge, MA 02140. NCP (June '87)

Klondike is a version of solitaire that uses video game-like scoring ★★★★★ to create a superb, totally addictive game. Simple to play, nearly impossible to stop playing. Version 3.3. Shareware: $10. Unison Software, 415 Clyde Ave., Mountain View, CA 94043. NCP (Dec '87)

Leather Goddesses of Phobos is another in the long line of witty ★★★★★ and entertaining Infocom text adventures. This one lets you choose your sex and comes with a 3-D comic and a scratch 'n' sniff card. It has three levels of play: tame, suggestive and lewd. $19.95. Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140. NCP (Feb '87)

Lode Runner is a 150-screen action-strategy challenge. Move around ★★★★ a grid of ladders and platforms collecting treasure; dig a hole to trap pursuers. Build your own challenges. $14.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. CP

Lunar Rescue puts you in the role of a benevolent trader ready to ★★★★½ save a moon colony from invasion. Blast the enemy while you travel from town to town trading goods for the supplies you need for your mission. Version 1.0. Requires 512KE. $59.95. PCAI, 1305 Jefferson Highway, Champlin, MN 55316. CP

MacGolf is a dynamic simulation of real golf. Players have a choice ★★★★½ of courses and difficulty levels. Superb playability makes this a must for all golfers and gamers. Requires 512K+. $59.95. Practical Computer Applications, 1305 Jefferson Highway, Champlin, MN 55316. CP (May '86)

MacMan is a two-part package. The software portion is a decent ★★★★★ PacMan-like game. The hardware part is a tiny converter that lets you use a joystick with a Mac or Mac Plus. $39.95. Nuvo Systems, 225 Tank Farm Road, San Luis Obispo, CA 93401. CP (Aug '87)

Mac Pro Football is a terrific sports simulation that gives you the ★★★★ chance to pit any combination of 38 Super Bowl teams against each other and direct team play. It comes with excellent, detailed (and necessary) documentation. Play selection can get a bit Byzantine. $49.95. Avalon Hill, 4517 Harford Road, Baltimore, MD 21214. CP (Mar '87)

MacRacquetball uses digitized videos and sounds of professional ★★★½ players for a realistic simulation. Has lots of control settings and can be played against someone else over a modem or between hard-wired Macs. Turn off hard disks before playing. $59.95. Practical Computer Applications, 1305 Jefferson Highway, Champlin, MN 55316. CP (Oct '87)

MoonMist is an introductory level text adventure game. This is a ★★★ typical haunted English castle story, not quite up to Infocom's best. It has four versions, so it's good for more than one play. $39.95. Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140. NCP (May '87)

MSFL: Pro League Football is a professional football league simu- ★★★★½ lation that encourages people to play people, not the machine. Fast with lots of stats. Quirky MS-BASIC behavior. Spotty manual. No LaserWriter support. Requires 1 megabyte +. $49. MicroSports, P.O. Box 15799, Chattanooga, TN 37415. NCP (Apr '88)

NewGammon is animated backgammon that will challenge even ★★★★ good players. Features include variable skill levels and strategies and options to play the Mac or watch the Mac play itself. An arcade-like high-speed mode is included. $39.95. Newsoft, P.O. Box 3046, Newport Beach, CA 92663. CP

NFL Challenge simulates coaching and watching professional foot- ★★★½ ball. Comes on two disks, one with program and System, the other statistical data. Play against either human or computer coaching. Plays are selected from pre-defined playbooks. $99.95. XOR Corp., 5421 Opportunity Court, Minnetonka, MN 55343. NCP (June '87)

Ogre is a strategy tank game played on a hexagon grid. The ogre is ★★★★ an intelligent cybertank out to smash your command post. Customize your defense. Exceptionally good Mac interface. Has two-player option. $30. Origin Systems, 136 Harvey Road, Building B, Londonderry, NH 03053. CP (Nov '87)

Orbquest is a fantasy role-playing adventure with better-than-aver- ★★★½ age puzzles and an excellent sense of humor. Not as sophisticated as some, but a good value. $49.95. QWare, P.O. Box 850415, Richardson, TX 75085. CP (Dec '86)

Patton vs. Rommel is a traditional-style strategic war game. It ★★★★ covers events in Normandy in 1944. While complex, it's well-designed and very playable. $39.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. CP (Apr '87)

Pinball Construction Set lets users create their own pinball ★★★★ games, as elaborate or as easy as desired. Uses MacPaint for backgrounds and has lifelike sounds (on 512K+ Macs). $39.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. CP (Jan '86)

PT-109 by any other name is Gato, a WWII submarine simulator ★ also put out by Spectrum. Three-year-old technology with a minor face lift. Version 1.0. Requires 512K. Mac II friendly; MultiFinder hostile. $49.95. Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501. NCP (Sept '88)

Puppy Love is a combined game and teaching tool. As you teach ★★★★½ your puppy tricks and routines, you learn the basics of programming logic. Great fun for all ages. Does not run from a hard disk. $29.95. Addison-Wesley, Route 128, Reading, MA 01867. CP (Mar '87)

Quarterstaff is a fantasy adventure game of the typical "good ★★★★ versus evil" variety. Ability to use characters in other adventures gives this game a lot of potential for development. Version 1.2. Requires 1 megabyte +. $49.95. Simulated Environment Systems, 800 South Pacific Coast Highway, Redondo Beach, CA 90277. NCP (Mar '88)

Seven Cities of Gold is an educational program masquerading as ★★★★ an adventure game and is practically unique in being equally good in both respects. You are to land (not the easiest part) in the New World and attempt to placate the natives, seed a few missions and collect gold. Nice work if you can get it. $39.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. CP (June '87)

Shadowgate is an icon-based graphic adventure. You, as the seed ★★★★½ of prophecy, must save the world from the evil warlock. Far surpasses all others with great animated graphics, sound, and adventure. $49.95. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. CP (Dec '87)

Shanghai challenges players to clear a board of all 144 tiles by ★★★★★ matching pairs of mah-jongg tiles and removing them. Terrif-

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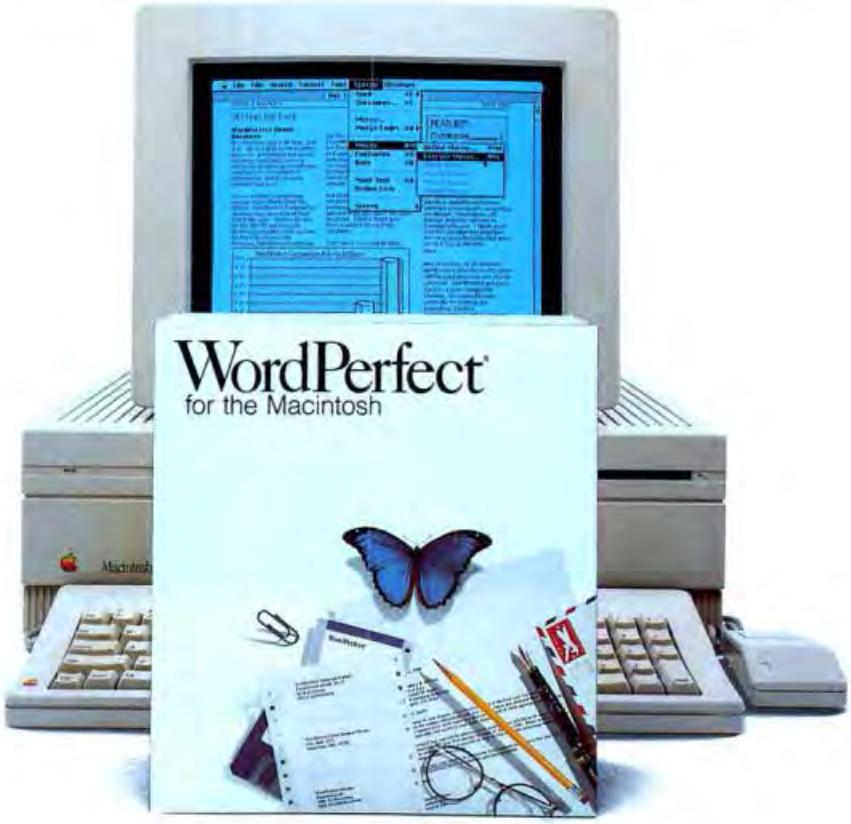
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ic strategic options plus the ability to randomly generate new game boards keep this one fresh. $44.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025. CP (Nov '86) ★'86 Eddy

Snake-Bar lets you guide a snake (or train or semi) through a maze, picking up objects that feed and make your snake grow. Options include changing languages, editing the maze, and an X-rated game. $15 (shareware). Georges Malmound, 37 Bis rue des Abbesses, Montmartre, 75018 Paris, France. NCP (Dec '87)

Solitaire Royale is a collection of eight solitaire card games. The Tour mode cycles through each game. Tournament deals the same hand for several players. $34.95. Published by Spectrum Holobyte, 2061 Challenger Drive, Alameda CA 94501. CP (May '88)

Space Quest is a three-dimensional, animated adventure in which you play a janitor in a dicey situation. All you have to do is get off your ship before it explodes and save the Earnon System. Runs on any Mac. $49.95. Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614. CP (Sept '87)

Star Fleet I: The War Begins! is a space opera of the Star Trek variety. Rise through the ranks from ensign to admiral in this serialized adventure. Requires 512K+. $55. Interstel, P.O. Box 57825, Webster, TX 77598. NCP (May '88)

Strategic Conquest Plus challenges you to discover an unexplored world and conquer it by manufacturing and deploying armies, ships, and planes. A two-disk game that doesn't support an external drive. Requires 512K+. $59.95. PBI Software, 1111 Triton Drive, Foster City, CA 94404. CP (Feb '88)

Sub Battle Simulator is a superior naval combat game. Sixty different missions and the ability to link missions keep it from ever getting boring. Requires 512K+. $39.95. Epyx, P.O. Box 8020, Redwood City, CA 94063. NCP (Aug '87)

Trust & Betrayal: The Legacy of Siboot requires negotiating with six artificial personalities in a struggle for power — not surprising considering that it comes from the maker of Balance of Power. Uses hieroglyphics to communicate in a fantasy world. Requires 512K+. Mindscape, 3444 Dundee Road, Northbrook, IL 60062. CP (Mar '88)

Ultima III allows up to four characters cooperate to explore the vast wilderness of Sosaria. $59.95. Origin Systems, 340 Harvey Road, Manchester, NH 03103. CP

Uninvited is an icon-based adventure game set in an extremely haunted mansion. Graphic interface makes it easy to play. Animation and sound add to the thrill. $49.95. Mindscape, 3444 Dundee, Northbrook, IL 60062. CP (Sept '86) ★'86 Eddy

Winter Games lets up to eight players compete against each other in Olympic events including figure skating, bob sledding, biathlon, and ski-jumping. Excellent animation, good graphics, good theme music. $39.95. Epyx, 600 Galveston Drive, P.O. Box 8020, Redwood City, CA 94063. CP (Mar '86)

Wizardry is an outstanding dungeon exploration adventure pitting a party of up to six characters against the guardian monsters of the evil wizard Werdna. Capture his amulet to earn your reward. Even after solving the game, you'll want to go back into the dungeon. $59.95. Sir-Tech, Charlestown-Ogdensburg Mall, P.O. Box 245, Ogdensburg, NY 13669. CP

WordPlay is a word game with over 50 crossword puzzles for different levels of expertise. User friendly, it offers on-screen Help menus. A Work mode allows development of new puzzles for the creative. $49.95. Palantir, 12777 Jones Road, Houston, TX 77070. NCP (Mar '86)

Your Personal Poet creates personalized greeting cards on the Mac. Comes complete with four greeting cards and matching envelopes. Requires 512K+. $29.95. Computer Poet, 775 E. Greg St., Sparks, NV 89431. NCP (June '87)

MUSIC

Alchemy loads and edits digitally sampled sounds from most commercial samplers. Works with 512K, but it eats up memory quickly. Requires MIDI or RS-422 interface, and sampler. $495. Blank Software, 1477 Folsom St., San Francisco, CA 94103. CP (Oct '88)

Apple MIDI Interface is a simple Musical Instrument Digital Interface with a 1 megahertz clock rate. Has only one MIDI input and one output. Works with all Macs; adaptor required for 128K and 512K. $99. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (June '88)

ConcertWare+ is an enhanced version of ConcertWare. Has different instruments and can use any four of a set of eight at any point in a piece. Supports Adobe Sonata music font. $69.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Dec '87) ★'85 Eddy

ConcertWare+MIDI is a composition and transcription program that can record multiple notes from a MIDI keyboard. Easy to use if you read music. Handles eight tracks of eight voices each. Requires 512K. Version 4.0. $149.95. Great Wave Software, 5353 Scotts Valley Drive, Scotts Valley, CA 95066. NCP (Dec '87)

Deluxe Music Construction Set lets you enter up to 48 voices on eight staves, and play the music through the Mac's internal speaker and/or via MIDI. Requires 512K+. Mac II and MultiFinder hostile. Version 2.0 reviewed. $99.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. CP (June '88)

Jam Factory is a program for performing complex manipulations on MIDI data in real time. Unique, entertaining, and very powerful, but requires lots of patience and practice. Requires 512K+, MIDI interface, and MIDI synthesizer. $189. Intelligent Computer Music Systems, P.O. Box 8748, Albany, NY 12208. CP (Oct '87)

Jam Session is a music program for those who think MIDI refers to the length of skirts. Without any skill, you can "Jam" with rock, jazz, rap, or country tunes. A sort of "Sing Along With Mitch" for the computer set. Requires 512K+. $49.95. Broderbund, 17 Paul Drive, San Rafael, CA 94903. CP (July '88)

Listen is an educational tool for ear training. It has both a piano keyboard and a guitar fretboard for the student to input notes, and offers a wide range of exercises. $99. Resonate, P.O. Box 996, Menlo Park, CA 94026. (Jan '87)

M is a music composition and creation program that works with MIDI data in real time. Unique, entertaining, and very powerful, but requires lots of patience and practice. Requires 512K+, MIDI interface, and MIDI synthesizer. $219. Intelligent Computer Music Systems, P.O. Box 8748, Albany, NY 12208. CP (Oct '87)

Master Tracks Pro is a full-featured, second-generation MIDI sequencer that adheres to the Mac interface very well. It's the first program to have graphic-controller editing. Needs patch chasing for professional use, but it's still a rock-solid program. $350. Passport Designs, 625 Miramontes St., #103, Half Moon Bay, CA 94019. CP (Dec '87)

MIDIBasic is a simple, but highly useful routine for writing MIDI software. Good stuff. Sketchy documentation. Works with both Microsoft and ZBasic. Requires 512K+ plus Basic. $49.95. Altech Systems, 831 Kings Highway, Shreveport, LA 71119. NCP (Aug '87)

Music Mouse is a music program in a genre all its own. Called an "intelligent instrument," Music Mouse gives you instant musical feedback as you move the mouse and type on the keyboard, which controls tempo, vibrato, volume, etc. $59.95. OpCode Systems, 444 Ramona St., Palo Alto, CA 94301. NCP (May '87)

MINIFINDERS

Performer is the definitive MIDI sequencer, and is priced accordingly. Includes looping, SMPTE synching, 32 simultaneous Ins and Outs, unlimited overdubbing, and compatibility with Professional Composer for transription. Version 2.2. Requires MIDI interface and 512K+. $395. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142. CP (Jan '88)

Professional Composer produces performance-quality sheet music using Adobe's Sonata font. Scores can be created from scratch or imported from Performer (and can be exported to Performer for MIDI playback). Requires 512K+. $495. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142. CP (Jan '88)

Softsynth creates sounds for additive synthesis samplers. Downloading from Mac to sampler is time consuming. Requires 512K, sampler, MIDI interface. $295. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct '88)

Sound Designer set the standard for editing samples on lower-cost samplers, but it still lacks real-time high-fidelity playback. Requires 512K, sampler, MIDI interface. Emax, E II, 2000/2002, DSS-1, S900,$495; all others, $395. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct '88)

Studio Session consists of two programs, an Editor, and a Player, that produce music with six voices of digitized sound. Excellent program plus good manual make this a good buy. $89.95. Bogas Productions, P.O. Box 6699, Terra Lina, CA 94903-0699. NCP (Aug '87) ★'86 Eddy

Turbosynth creates sounds for a digital sampler using modular synthesis techniques. Good harmonic spectral inverter. Lacks an easy method of multisampling. Requires 1 megabyte, sampler, MIDI interface. $349. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. CP (Oct '88)

UpBeat turns the Macintosh into a front panel for a highly complex and versatile drum machine. Input patterns with mouse, MIDI keyboard, or drum machine. Requires 512K. $150. Intelligent Music, P.O. Box 8748, Albany, NY 12208. CP (May '88)

HARDWARE & ACCESSORIES

AppleCD SC reads CD-ROM optical discs that contain up to 656 megabytes of data. Also plays audio CD discs. Reads High Sierra format, an industry standard for CD-ROM. Requires SCSI port. $1,295. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (Dec '88)

AST TurboScan is a 300 dpi scanner with sophisticated graphics software. Scans at resolutions from 72 to 300 dpi. SuperScan software offers halftone, line art, and mixed modes. "Virtual memory processing" lets you scan images too large to fit in RAM. $1,899. Requires 512K+. SuperScan software included. AST Research, 2121 Alton Ave., Irvine, CA 92714. NCP (Nov '87)

Classic Professional Graphics Display is a low-cost color monitor for the Mac II. Good value, but has an IBM-look about it. Green tint is annoying. Requires Apple video card. $549. Classic Components, 1490 Artesia Blvd., Gardena, CA 90247 (June '88)

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MINIFINDERS

CMS S-140 SCSI Hard Disk is a very fast, high-capacity SCSI hard disk with a unity interleave and average access time of 18 milliseconds. Holds 140 megabytes. Help, file transfer, and tape back-up commands built-in. Hard Disk Partition is a useful DA. Comes with a 6-foot SCSI cable. $2,995. CMS Enhancements, 1372 Valencia Ave., Tustin, CA 92680. (July '87)

ColorVue SE is a video processor board for the Mac SE that lets you display 16 colors on an exernal RGB monitor. Slows up performance. $695. Orchid Technology, 45365 Northport Loop West, Fremont, CA 94538. (Oct '88)

DASCH is an external RAM disk available in ½-, 1-, and 2-megabyte sizes. Connects to a serial port. Speeds up operations 200 to 300 percent. Can be used as a printer buffer. Works with all Macs. 512K, $395; 1M, $450; 2M, $545. Western AutomationLaboratories, P.O. Box 3438, Boulder, CO 80307. (Feb '87)

Data Frame 40XP is a very fast, very quiet 40-megabyte external SCSI hard drive. Comes with a good and complete set of utility software. About as fast as a SCSI drive can be. Requires SCSI port, 512K+, new ROM. $1,899. SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043.

DaynaFile hooks up to a SCSI drive to read MS-DOS disks in the Mac environment. Use Mac applications to manipulate data created with an IBM PC. Comes in both 5.25 and 3.5 inch formats. $595 for single floppy. Dayna Communications, 50 S. Main St., Fifth Floor, Salt Lake City, UT 84144. (Jan '88) ★'87 Eddy

DEST PC Scan 2000 is an 8-bit scanner that saves images in up to 256 levels of gray. Can be configured for IBM PCs. Requires 1 megabyte. Scanner, $1,495; Publish Pac software, $595; OCR text processor card, $995. DEST Corporation, 1201 Cadillac Court, Milpitas, CA 95035. NCP (Dec '88)

Felix is an optical-tracking graphics tablet that replaces a mouse. Precision mode gives pixel-by-pixel control. Doesn't collect dirt like a mouse does. The 6-inch square device is designed primarily for right-handed people. Works with Mac Plus. $149. Lightgate, 6202 Christie Ave., Emeryville, CA 94608. (Sept '88)

FX-20 is a good 20-megabyte external hard drive. Good utility software. Reliable and reasonably quiet. Sits next to the Mac, has a large, oddly-shaped case. Requires SCSI port, 512K+, new ROM. $1199. General Computer, 215 First St., Cambridge, MA 02142. (Feb '87)

Grappler LQ hooks Macs up to parallel laser and 24-pin letter-quality printers. A cable, driver software, and special fonts combine to make dozens of once-unfriendly printers now compatible with the Mac. Requires 1 megabyte and a parallel printer. $149. Orange Micro, 1400 North Lakeview Ave., Anaheim, CA 92807. (Nov '88)

Hard Disk 20SC is Apple's 20-megabyte SCSI hard disk. Reliable, fairly noisy unit. Good utility software, but no back-up yet. Requires cable and terminator ($80). Requires SCSI port, 512K+, new ROM. $1,299. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (Feb '87)

Hewlett-Packard ColorPro Graphics Plotter is an eight-pen desktop plotter that requires third-party software to drive it. Fonts

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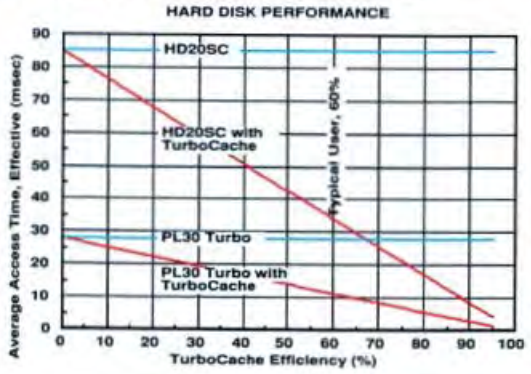


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MINIFINDERS

are limited to an optional Graphics Enhancement Cartridge that requires some BASIC programming. $1,295. Hewlett-Packard, 16399 W. Bernardo Drive, San Diego, CA 92127. (Feb '88)

HyperDialer provides an interface between a phone and your Mac ★★★½ so you can "dial" a number using one of the Rolodex-type programs, like SideKick, Focal Point or QuickDex. Hooks up between the Mac's sound port and a telephone handset. Requires 128K. MultiFinder friendly. $39.95. DataDesk International, 7651 Haskell Ave., Van Nuys, CA 91406. (Sept '88)

ImageMaker shoots 35mm color slides direct from the Mac. Sup- ★★★★ ports most presentation software. Uses patterns to represent colors. Not fully compatible with the Mac II. Requires 512K+. $4,995. MacDriver software, $149. Presentation Technologies, 743 North Pastoria Ave., Sunnyvale, CA 94086. (Feb '88)

IS/ONE tablet with **Penworks** software lets you use a corded or ★★★½ cordless pen or mouse and a high-res tablet for precise graphics input. Minor bugs with some applications and DAs. Keystroke macros can be launched from the tablet. Minimal documentation. Requires 1 megabyte +. $595 to $1145. Kurta, 4610 S. 35th St., Phoenix, AZ 85040. (Jan '88)

Jasmine Direct Drive 50 is a very quiet 1:1 interleave 50-megabyte ★★★★★ hard drive and one of the fastest SCSI drives around. A small fan keeps it cool, but it's still quiet. $1,159. Jasmine Technologies, 555 De Haro St., San Francisco, CA 94107. (Mar '88) ★'87 Eddy

LaserWriter II NT is Apple's mid-priced PostScript laser printer. It's ★★★ faster than the LaserWriter Plus, with blacker blacks. Gray scale is less even than that of Plus. Requires 512K+. $4,599. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May '88)

Laser Writer II NTX is Apple's top-of-the-line PostScript laser print- ★★★★½er. 68020 chip makes it very speedy; expandable to 12 megabytes; SCSI hard disk can be attached for fonts. Requires 512K+. $6,599. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May '88)

LaserWriter II SC is Apples's low-end QuickDraw laser printer. Can ★★★ be upgraded to NT or NTX; reasonably fast. Requires 1 megabyte +. $2,799. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (May '88)

MacADIOS II is a hardware and software interface for laboratory ★★★★ instruments. Standard configuration samples up to 142 kilohertz. Documentation is sketchy. $1,290 for Macintosh II-ready data acquisition card; $600 for MacADIOS II software interface. GW Instruments, 264 Msgr. O'Brien Highway, Cambridge, MA 02141. (July '88)

MacBottom 45 SCSI and Internal Modem has a modem that fits ★★★★½into the top half of the 45-megabyte SCSI hard-drive case. Comes with HFS Backup and Eureka. $1,795. PCPC, 4710 Eisenhower Blvd., Tampa, FL 33634. (Oct '87)

MacBottom HD21 is a very low (about 2 inches high), external 20- ★★★★★ megabyte hard drive. Fits under the Mac. Very quiet, very reliable. Good utility software, including HFS Backup. Requires SCSI port, 512K+, new ROM. $1,195. PCPC, 4710 Eisenhower Blvd., Tampa, FL 33634. (Feb '87) ★'86 Eddy

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MINIFINDERS

Mac Crate 60MB Hard Disk puts a Seagate drive in a platinum casing. At $14 per megabyte, it's a good consumer value. Also comes in 20-, 40-, and 80-megabyte models. Requires SCSI port. $839. Crate Technology, 6850 Vineland Ave., Bldg. M, North Hollywood, CA 91605. (Nov '88)

MacIntizer is a graphics tablet and absolute positioning device that replaces the mouse. Various scales are possible. $599. GTCO Corp., 7125 Riverwood Drive, Columbia, MD 21046.

MacLarger is a 12-inch external monitor for 512K machines on up to the SE. Displays the same number of pixels as an internal monitor, only one-third larger. Bigger and brighter, but less crisp than the Mac's own screen. $449. Power R, 1606 Dexter Ave. North, Seattle, WA 98109. (Apr '88)

MacPacq transforms the Macintosh into a digital oscilloscope, waveform generator, and chart recorder. PacqManager is software expandable via external routines in Turbo Pascal and other languages. Version 1.03 reviewed. $995. Biopac Systems, 42 Aero Camino, Goleta CA 93117. NCP (July '88)

MacRecorder is an easy-to-use sound digitizer. Includes software to turn sounds into HyperCard buttons, mix sounds, add special effects, and convert sound formats. Stereo recording possible on a Mac II. Requires 512K+. $199. Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704. NCP (June '88)

MacSnap Plus 2 is a 2 megabyte memory upgrade for the Mac Plus. The board has 256 kilobit chips. User installable. Not compatible with existing big screens or internal hard disks, and can't be expanded further. $729. Dove Computer, 1200 N. 23rd St., Wilmington, NC 28405. (June '87)

MacTable is an elegant Danish worktable that holds a Mac and printer with room to spare. The 30-inch deep by 60-inch wide table is made of particleboard and must be assembled. Cabinet is optional. Table, $289; cabinet, $139. ScanCoFum, P.O. Box 3217, Redmond, WA 98073-3217. (Mar '88)

MacTablet is a stylus-driven graphics tablet. Users can easily sketch or trace art using this absolute-positioning device. Has a working area the size of the Mac screen. Allows concurrent use of the mouse. $495. Summagraphics Corp., 777 State St. Extension, Fairfield, CT 06430. (Jan '86)

MacTilt/MacTilt SE is a Mac (and external drive) holder that allows a full range of swiveling and tilting. Very strong, this well-made unit is also very easy to use. $99.95. Ergotron, P.O. Box 17013, Minneapolis, MN 55418.

MacVision is a digitizer that uses an ordinary video camera for input. Capable of extremely fine results and special effects. Easy to use and well-documented. $349.95. Koala, 269 Mount Hermon Road, Scotts Valley, CA 95066.

Mac-101 is a keyboard alternative that has a good feel to it. Has a keypad, 15 function keys, and more. The 101-Keys desk accessory lets you define macros. Comes in an ADB version for the SE and II. Requires 512K+. $169.95. DataDesk International, 7650 Haskell Ave., Van Nuys, CA 91406. Software NCP (Apr '88)

Magic Digitizer is a hardware digitizer that works with video cameras. With LaserMagic software you can generate 300 dpi images (in PostScript). Requires 512K+. Digitizer with Magic software, $399.95; LaserMagic software, $49.95. New Image Technology, 10300 Greenbelt Road, Seabrook, MD 20706. NCP (May '87)

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MINIFINDERS

Microtek MSF-300C is a 300-dpi flatbed scanner. Really fast when used with optional MS-SCSI/C adapter. Comes with VersaScan Plus software (NCP) to scan and manipulate image. Saves images in a number of formats including TIFF and MacPaint. $1,895. Microtek Lab, 16901 S. Western Ave., Gardena, CA 90247. (Dec '87)

Migent Pocket Modem is a 300/1200 baud portable modem about the size of a 3-x-5 index card. Comes bundled with MacTerm 2.0, Borland's telecom DA. Manual is confusing, and tech support is minimal. $259. Migent, 865 Tahoe Blvd., Incline Village, NV 89450-6062. (Nov '87)

Mouse Mover is a mouse pad-type surface that snaps onto the bottom of the mouse like a roller skate, freeing it up to glide over desk or mouse pad with ease. 99 tiny ball bearings at three strategic points. Mouse glides faster and saves on mouse wear and tear. $19.95. Magnum Software, 21115 Devonshire St., Chatsworth, CA 91311. ★'85 Eddy

Moustrak is a fabric-covered foam mousing pad. It will increase the efficiency of your mouse while helping to keep it clean. Pad comes in a variety of colors. Particularly useful in the typical office desktop environment. $10. Moustrak, 3047 St. Helena Highway, Saint Helena, CA 94574.

NetModem is a 1200-baud modem that can be accessed by all users on an AppleTalk network. The modem's display lights and the dial tone are simulated on-screen. Requires 512K+. $599. Shiva, Suite 1200, 222 Third St., Cambridge, MA 02142-9919. (Feb '88)

One Plus One is a user-installable memory upgrade for a Mac Plus. Adds 1 megabyte of RAM to the 1 megabyte already there. Simple one-evening project. Includes MacBreeze, an excellent small fan. Requires Mac Plus. $375. Levco, 6160 Lusk Blvd., San Diego, CA 92121. (Aug '87)

Personal LaserPrinter is a non-PostScript laser printer at a great price. Clumsy workarounds required in some applications. Printing can be slow. Requires 1 megabyte +. $1,999. Fonts Plus, $299. General Computer, 580 Winter St., Waltham, MA 02154. (Apr '88)

Personal Writer PW15 S is a tablet-based handwriting recognition system that also allows graphics and macros. Number of misread characters is too high for general word processing. Requires 1 megabyte +. $895. Personal Writer, 1801 Avenue of the Stars, Los Angeles, CA 90067. Software NCP (Mar '88)

PhoneNET is an AppleTalk-compatible network. Network can be up to 3,000 feet in length. In-place, unused phone cabling can be used for network, and can be combined with AppleTalk on the same network. $49 per node. Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704. (Dec '86) ★'87 Eddy

ProPoint replaces the mouse with an ADB trackball. Works better on the SE than it does on the Mac II. Lefties will find the button positions uncomfortable. Requires SE or Mac II. $139.95. Abaton, 48431 Milmount Drive, Fremont, CA 94538. (Oct '88)

QMS Colorscript 100 is the first color PostScript printer that uses a four-color thermal wax transfer technology. Works on AppleTalk. Excellent typographic capability. Currently supports

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MINIFINDERS

only a handful of applications. Requires 1 megabyte. $24,995. QMS, 1 Magnum Pass, Mobile, AL 36618 (Oct '88)

QMS-PS 810 is an eight-page-per-minute, 300-dpi PostScript laser printer that competes with the LaserWriter NT. 2 megabytes of RAM is standard; upgradable to 3 megabytes. Emulates H-P LaserJet, 7475 (HPGL), and Diablo 630. $5,495. Laser Connection, 7852 Schillinger Park West, Mobile, AL 36608 (July '88)

QuickShare adds a SCSI port to an IBM PC for easy connectivity with a Mac. Can use an IBM's hard disk to run Mac applications. Requires SCSI port. Mac II and MultiFinder friendly. Version 1.24 reviewed. $465. Compatible Systems, P.O. Drawer 17220, Boulder, CO 80308. (June '88)

Radius Accelerator 25 can make your Mac SE run 50 percent faster than a Mac II. The add-in accelerator card has a Motorola 68020 CPU that runs at 25 megahertz, and an optional 25 megahertz 68881 math coprocessor. $1,695; $2,195 with optional 25-megahertz 68891. Radius, 404 East Plumeria Drive, San Jose, CA 95134. (Oct '88)

SpeedCard is an accelerator board for the Macintosh SE that more than doubles the speed of most applications. The board uses the 68000 chip found in the SE and an optional floating point 68881 chip for number crunching. Requires Macintosh SE. $399; $699 with coprocessor. SuperMac Technology, 295 North Bernardo Ave., Mountain View, CA 94043. (Nov '88)

SuperRam 2 and SuperRam 4 are 2- and 4-megabyte RAM upgrades. Should be dealer installed but can be (carefully) user installed. SuperRam 2 includes RAM adaptor module, 1-megabyte memory module, modified power cable, jumper and fan. SuperRam 4 adds power supply booster and two 1-megabyte memory modules. Not compatible with most big screens. $499. SuperMac Technology, 295 N. Bernardo, Mountain View, CA 94043. (Oct '87)

Tektronix 4693D Color Printer is a 300 dpi bit-mapped color printer. Colors look smooth and rich. Uses bit-mapped screen fonts; most type has noticeable jaggies. Requires Mac II with color monitor. Recommended 8-megabyte configuration, $11,490. Tektronix, P.O. Box 500, Beaverton, OR 97077. (Oct '88)

ThunderScan replaces the ribbon cartridge in an ImageWriter, which is required to use it. Laser scans art that can be run through the ImageWriter, producing high-quality digitized images. The images can be manipulated as they are created or afterward. $249. Thunderware, 21 Orinda Way, Orinda, CA 94563. ★'85 Eddy

TimeWand is a bar-code reader with a built-in time/date stamping clock. Can be used with TimeWand Manager software, a database that's extensive though difficult to use. Poor docs, but good support. Requires 1 megabyte +. TimeWand 2K version, $198; TimeWand Manager, $489. Videx, 1105 N.E. Circle Blvd., Corvallis, OR 97330-4285. (Dec '87)

TV Producer is an add-in card that overlays Mac graphics and text onto a video signal. Software is clumsy to use. Requires Mac II, Apple video card, and video souce. $599. Computer Friends, 14250 N.W. Science Park Drive, Portland, OR 97229. Software NCP (May '88)

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MacUser

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Editors absolutely reserve the right to publish none, some, all, or just the parts we managed to complete of the above, due to the inherent problems that occur when reviewing software, hardware, and the ever-elusive vaporware.

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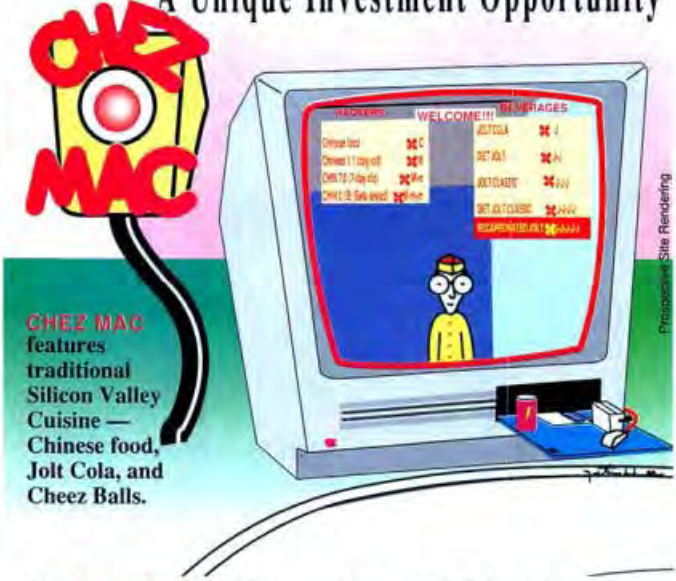
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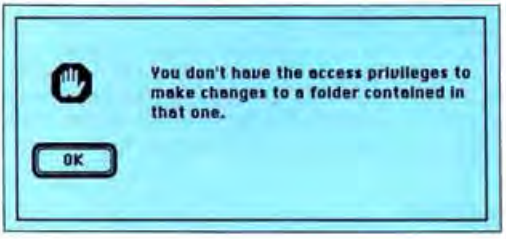


Gad! It must be contagious! The more dialog boxes we see, the more they read like Danny Kaye on acid (or Henry Kissinger anytime).

Your intrepid correspondent came across this classic of convoluted confusion while trying to move a folder onto the office's file server. Moving the folder was a snap, but trying to figure out the dialog box took the rest of the morning.

Now if you, dear reader, had sent this goodie in, we would've sent you a check for $25; but since you didn't, all that money is mine. But you'll have a shot at the big bucks next time, provided you print out a copy of your fave and save a copy of the screen in MacPaint format (Command-Shift-3), so we can reproduce it. Send your submissions to Dialog Herb, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404.

— *H. D. Plant*



PACIFIC RIM SHOT

Apple's latest restructuring spelled a marked reduction in authority for Del Yocam, a ten-year veteran of the company who for years has been a low-keyed but pivotal decision-maker there. No longer chief executive officer, he is now in charge of sales to countries on "the Pacific Rim." Even well-connected pundits have been left somewhat puzzled regarding this move and terminology. However, *MacUser* has learned that the strategy could stem from severe overcrowding in costly Cupertino, with plans now to open an Apple campus headed by Mr. Yocam on Attu, in the Aleutian Islands. American servicemen have long referred to Attu as "Top of the Rim" and "American Siberia."

Yocam has told the *San Francisco Chronicle* that Apple intends to hire 5,200 employees between now and the end of fiscal year 1989, with a pause for consideration of a "possible industry slowdown next year." Some analysts interpreted this initially as careful planning and good foresight, in that it would allow for a potential 1989 layoff of at least 1,500 while in no way slowing Apple's unprecedented, simultaneous growth.

But taken in tandem with the Aleutian connection, it now seems clear that at least 2,000 of the new hires will be sent to Alaska to work on "MacPipeline," as it has been dubbed: 6,260 miles of AppleTalk connector cable slated to link Attu to Cupertino. The "slowdown" could well refer to anticipated seasonal Arctic caribou migrations, or to the fact that many of those who will be working on the cable have a strong background in public relations. And as marketing considerations rule out third-party options for use by Apple itself, the entire stretch will reportedly be bridged by 30-foot AppleTalk cable extension kits, at a cost of over $7.2 billion.

— *John Anderson*



Coy? Well, yes, Apple was awfully coy about releasing the name of the the Mac IIx, the souped-up 68030 machine (which we had dubbed the '030something machine). Will there be a souped-up SE called the SEx? And, if so, will we be seeing one on Maddie Hayes' desk?

Speaking of coy-itus interruptus, how about that full-page ad in the premier issue of *Smart* magazine (the sassy new quarterly with Jack Nicholson on the cover looking awfully — oh, I don't know — coy?) that consisted of the single sentence "Compliments of a friend" with the oh-so-cryptic 'n' coy footnote: "The text and design of Smart magazine are produced with Apple Macintosh Computers." (The *Smart* folks should check the first cover of *MacUser* for the correct spelling of *premier*, though. Ditto to our new sister publication, *PC Computing*.)

Address your coy-respondence to Mac on the Street, *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404.

— *Jon Zilber*

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Les HAUTES QUOTES

"We're calling this program 'Hindsight, and the power to beat your chest.'"
— Jean-Louis Gassée, France's funniest export since de Gaulle, and the Apple executive voted most likely to be mistaken for Carl Sagan, touting the first anniversary of HyperCard at the Apple press conference at the Boston Macworld Expo.

"HyperCard is for real people and real men."
— Jean-Louis Gassée, Apple's unmitigated Gaul and the future host of the TV series "Real Men Aren't Real People."

"HyperCard is a product that the market has perverted."
— Jean-Louis Gassée, well, whaddaya expect? He's French.

HIT LIST

Back in August, moviegoers had their chance to show their loyalty to their computers by choosing between *Mac and Me* and *The Big Blue*.
However, both were flops, as computer jocks were spending all their time playing with new software. Here's what was hot, as reported by Egghead Discount Software.

1. **MacDraw II** Claris
2. **Microsoft Excel** Microsoft
3. **Microsoft Word** Microsoft
4. **TOPS** TOPS
5. **Symantec Utilities for Macintosh** Symantec
6. **Microsoft PowerPoint** Microsoft
7. **The Toy Shop** Broderbund
8. **PageMaker** Aldus
9. **The Print Shop** Broderbund
10. **MacWrite** Claris

ICH BIN EIN MACINTOSHER

It isn't often we get a chance to plug another magazine, but this is different. *Macintosh Magazin* is a new publication for the German Mac user, and we're sure they're good because their editor told us he liked us. (We can afford to plug them because, as far as we know, they don't plan to compete with us over here. Once they do, all bets are off.)

Macintosh Magazin is laid out on *der desktopische* using the German version of PageMaker, and FreeHand for all the display type. If you'd like to find out more, you can reach them through their parent company, Markt & Technik, Hans-Pinsel-Straße 2, 8013 Haar, Munich, West Germany.

— *Russell Ito*



Sprechen Sie Mac? *Macintosh Magazin* is a new German publication.

BUG OF THE MONTH



"Whaa . . . that's not what it's supposed to look like!" That — or words to that effect — was Salvatore Parascandolo's reaction when he saw the results of some noodling around in Claris' MacDraw II.

Sal selected a number of objects, grouped them, then rotated the group. But when he tried resizing it, whoa! The objects didn't scale evenly — some shrank too much, and others didn't shrink at all. And when he performed a minor rotation on a group, then stretched it horizontally, surprise! The group's objects stretched *vertically!*

We confirmed the bug, and found that Sal made only one mistake: He waited until after we'd hired him on as a staff writer to tell us about it. If he'd gotten it in while he was still a freelancer, we would've sent him a $25 check for his troubles (considerably more than we're paying him now). So if you've found a bug, don't wait for us to hire you before you tell us. Send your bugs to Bugsy, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404. And make sure you tell us your System and Finder versions, hardware configuration, and any unusual DAs or INITs you may have installed.

— *H. D. Plant*

Cocaine can make you blind.

Cocaine fools your brain.

When you first use it, you may feel more alert, more confident, more sociable, more in control of your life.

In reality, of course, nothing has changed. But to your brain, the feeling seems real.

From euphoria...

You want to experience it again. So you do some more coke.

Once more, you like the effects. It's a very clean high. It doesn't really feel like you're drugged. Only this time, you notice you don't feel so good when you come down. You're confused, edgy, anxious, even depressed.

Fortunately, that's easy to fix. At least for the next 20 minutes or so. All it takes is another few lines, or a few more hits on the pipe.

You're discovering one of the things that makes cocaine so dangerous.

It compels you to keep on using it. (Given unlimited access, laboratory monkeys take cocaine until they have seizures and die.)

If you keep experimenting with cocaine, quite soon you may feel you need it just to function well. To perform better at work, to cope with stress, to escape depression, just to have a good time at a party or a concert.

Like speed, cocaine makes you talk a lot and sleep a little. You can't sit still. You have difficulty concentrating and remembering. You feel aggressive and suspicious towards people. You don't want to eat very much. You become uninterested in sex.

To paranoia...

Compulsion is now definitely addiction. And there's worse to come.

You stop caring how you look or how you feel. You become paranoid. You may feel people are persecuting you, and you may have an intense fear that the police are waiting to arrest you. (Not surprising, since cocaine is illegal.)

You may have hallucinations. Because coke heightens your senses, they may seem terrifyingly real.

As one woman overdosed, she heard laughter nearby and a voice that said, "I've got you now." So many people have been totally convinced that bugs were crawling on or out of their skin, that the hallucination has a nickname: the coke bugs.

Especially if you've been smoking cocaine, you may become violent, or feel suicidal.

When coke gets you really strung out, you may turn to other drugs to slow down. Particularly downers like alcohol, tranquilizers, marijuana and heroin. (A speedball—heroin and cocaine—is what killed John Belushi.)

If you saw your doctor now and he didn't know you were using coke, he'd probably diagnose you as a manic-depressive.

To psychosis...

Literally, you're crazy.

But you know what's truly frightening? Despite everything that's happening to you, even now, you may still feel totally in control.

That's the drug talking. Cocaine really does make you blind to reality. And with what's known about it today, you probably have to be something else to start using coke in the first place.

Dumb.

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BRIGHT IDEAS

Okay, you've come up with a new use for disk labels and want to share it with everyone. Now you have a platform to do so — Bright Ideas. Just send us your goofy tip (you can reinvent the mousepad while you're at it), and if we like it we'll print it. Oh, and you'll get $10 for your efforts, along with industry-wide recognition. Send your tips to Bright Ideas, c/o *MacUser*, 950 Tower Lane, 18th floor, Foster City, CA 94404.

I'LL TRADE YA

Do you have a bunch of disks lying around, on, or in your desk and everywhere? You can organize them all in one place without spending a lot of money on a disk holder. Go to your local baseball card store and buy some baseball card boxes. Baseball cards (at least the ones I buy) measure 3.5 inches by 2.5 inches — perfect for a Mac disk. This way, you can put your disks in the box and be able to pull them out easily. Normal-size boxes hold 800 cards or 90 disks, but you can get larger varieties that hold up to 562 disks. (Note: You will have to cut off the box top.)

DANIEL R. SCHMIDT
PORTSMOUTH, RI



BUTTON UP YOUR OVERCOAT

While some like to house their computers in oak cabinets, I feel the Macintosh's plastic shipping bag makes a fine, practical dust cover. And if you like the idea of the Mac as a portable machine, a plastic crate is perfect for transport. I found 2 sizes that fit my needs. My compact box barely houses my Mac SE, protective towel, mouse, and keyboard. I also found a delivery model with room to haul the computer, surge protector extension cord, an external hard disk, and even squeeze in a couple of software manuals when necessary. I purchased both for less than $15 and believe they are as sturdy and shock resistant as any $90 carrying bag. And can you use those bags as a table when the meeting gets crowded?

When it rains, I protect my investment with an extra layer of trash bags.

BOB SCHMIDT
NORFOLK, VA



Stop by the MacUser booth at the next Mac show you attend, and pick up one of our trademark plastic yellow bags. Turned upside-down and trimmed to fit, they'll also do the job. — JZ

NERD'S EYE VIEW

It may look like a ball machine you might find on a tennis court, but the Mac Disk Duplicator from Douglas Electronics is a useful item to have at your disposal. Tired of twiddling your thumbs while you wait for one disk to be formatted? With this little RoboCopier, you can format 70 or so disks while you go off to take care of other things. Just place the disks in the feeder (metal side pointing up), turn the machine on, and set your Mac for formatting. A floppy disk drive sits on a plate opposite the feeder. This plate is at the end of an arm with a hinge, bringing the disk drive up to the end of the feeder when it's empty and moving the drive down once it has a disk inside. A metal plate slides up the feeder, pushing a disk off the end and into the floppy drive.

User groups and small companies will find this product useful for duplicating disks. You could also use one when backing up your hard disk.

The complete system from Douglas Electronics comes with MassCopier software to format, write, verify, and eject each disk. You can also use similar programs with the system, which sells for $1,000. For more information, contact Douglas Electronics, 718 Marina Boulevard, San Leandro, CA 94577; (415) 483-8770.

— *Kristi Coale*

DO YOU KNOW ME?



A reject from "The Golden Girls"?
The subject of Albert Goldman's next trashy bio?

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☐ d) IBM PC ☐ e) Other

2. For how many micro computers do you buy products?
☐ f) 1-4 ☐ g) 5-49
☐ h) 50+

3. Your primary job function is (Check one):
☐ i) Administrative/General Management
☐ j) MIS/DP, Communications Systems, Programming
☐ k) Engineering/R&D
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☐ n) Computer Dealer/VAR

4. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (Check all that apply.)
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☐ o) Accounting
☐ p) Spreadsheets/Financial Planners
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☐ r) Word Processors
☐ s) Database Managers
☐ t) Graphics
☐ u) CAD/CAM
☐ v) Communications
HARDWARE
☐ w) Mainframe
☐ x) Mini
☐ y) PC
☐ z) Printers/Plotters
☐ 1) Monitors
☐ 2) Disk/Tape Back-up
☐ 3) Add-in Boards
☐ 4) Communications

5. Are you involved in the purchasing of microcomputer equipment at your company? ☐ 5) Yes ☐ 6) No

6. If so, what function do you serve in the buying process?
☐ 7) Evaluations/Specification ☐ 8) Recommendation
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Cocaine is extremely addictive. Maybe more so than heroin. If you smoke coke—as freebase or crack—you could get hooked from the very first hit.

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Cocaine can alter brain chemistry until you prefer it over everything—food, water, even sex. It could also make you do things you wouldn't normally do.

One woman sold her baby to buy coke. And a 14-year-old killed his mother when she tried to stop his crack habit.

It may sound exaggerated. Unbelievable. You may think it could never happen to you.

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Grow up.

With cocaine, you never know whether you'll get hooked or not. Or whether you'll die or not. And no one in the world can tell you. No doctor. No expert.

But when you face that first line, you may be hearing a lot of other things. Like coke's a fantastic trip. Or that everybody who's somebody does it. You might even hear that it'll make you a man.

But now you know what cocaine can do to you.

And if you really want to prove you're a man, you'll make your own decisions.

Partnership for a Drug-Free America

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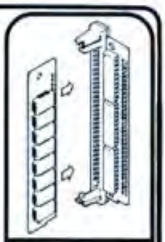
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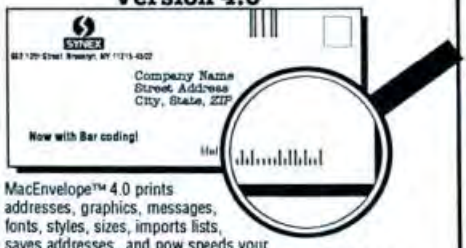
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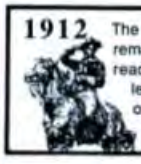
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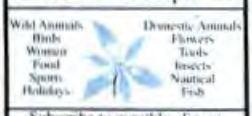
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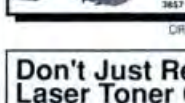
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by John C. Dvorak

The Cudding Edge

The desktop metaphor. That's what the Macintosh opening screen and interface is based on. That's what everyone says, anyway. By definition a metaphor refers only to words and not to computer images, so I think the term is misused. Symbolic desktop may be more appropriate, but who said anyone at Apple was literate? Besides that, definitions change with usage, so desktop metaphor it is.

The idea is that the desktop is represented on the screen. You've got your file folders and trash bin, and you shuffle them around. The metaphor, as it were, doesn't go much farther than that. So why can't people come up with anything different when it comes to a Mac-like graphical interface running on some other system?

It's interesting to note that the Mac-like GEM interface used by Atari and others did little more than change the interface by turning file folders into drawers and the waste can into a waste basket. Meanwhile, Apple sued Hewlett-Packard for its New Wave interface, which is a hopeless copy of the Mac desktop metaphor.

Is there any creativity out there at all? I sat down with a few friends and developed a dozen ideas for new metaphors. Coming up with substitutes for the garbage can is the easiest thing to do. How about a garbage truck? You could add compaction sound effects and have it drive off when dumped. There's also a flaming burn barrel; why not use that? What about a noisy garbage disposal? There are a million possibilities. Why do companies just copy the can? I mean you could have Jabba the Hut in the corner eating discarded data. Let's get with it!

And what's so damned sacrosanct about the desktop? Let's think big. I like the idea of the oil-refinery metaphor. Instead of the waste can, how about a sludge treatment plant? Most bad software is sludge anyway. The programs can be represented by various refining units. Data and programs wouldn't be kept in file folders, but in tanks. Get the idea?

How about a farm metaphor? The crops would replace the file folders. A goat would replace the garbage can. Here's where the



mouse would have new meaning. This is easy stuff to dream up.

My personal favorite is the cow metaphor. The programs and data would be represented by cud. Programs and data, if not used, would dribble into the various stomachs as a function of time. After they hit the fourth cow stomach they'd either have to be backed up or they'd be automatically digested and turned into manure. The manure would represent the garbage can and it could be recycled (saved) or discarded. This would be a self-cleaning system too. Let's face it, most software and many files are often forgotten and never used after a while. Soon the entire system is clogged with stupid files you'll never use. Disk space shrinks to nil.

This all happens because the system is not dynamic like a living cow. Instead, it's a desktop! A desktop needs to be maintained. This takes work. Isn't the computer supposed to relieve us of some of this nastiness? Well, the cow metaphor does it.

Now a lot of people will immediately perk up and suggest that the pig metaphor better suits many of the systems we are beginning to see. Unfortunately, the pig doesn't have the stomach physiology of the cow and the potential use of the cud function makes the cow an ideal computer metaphor. A pig eats, rolls in mud, and defecates. Not much complexity there. Perhaps it would be OK on one of those archaic one-disk systems.

A cow moo for an error message and the cowbell startup sound would be a welcome relief in any office where employees are tired of hearing obnoxious beeps, boops, and blats. We haven't even discussed the function of the cow's udder and its milk-producing prowess. Files could be represented by bottles of milk.

The various parts of the cow can represent obvious functions. Click on the mouth, and you get your telecom files. Are you a programmer? Then click on the cow's tail and get your debugging tools (think about it).

I honestly don't believe that the boring desktop metaphor is in any way better than my cow metaphor. This is no bull.

The question falls back on the shoulders of Microsoft, HP, and other promoters of Mac look-alike interfaces: Why copy an old idea when better solutions are available? Even on the Mac itself we have HyperCard, which tosses out the desktop metaphor in favor of a simplistic 3-x-5-card metaphor. It's mundane when compared with the cow metaphor, but it sure outshines the uncreative stuff from the competition.

Perhaps these copycats should look in the mirror and, as uncreative followers of style, realize that they should develop a sheep metaphor. It's goes "Baaaaaa" when you boot the machine. The programs are fleece (even though it's usually the user who is fleeced by programs), and the discards are put into a little sweater that is being knit in the corner.

Let's not forget the dog and cat metaphor, lemmings, pack rats, horses, snakes, dung beetles, and jackasses. An argument can be made for each one of these critters as a metaphor to replace the desktop. Maybe all of them! They sure symbolize many of the human critters we run into in the world of high technology. And *that*, my friend, ain't no bull either.

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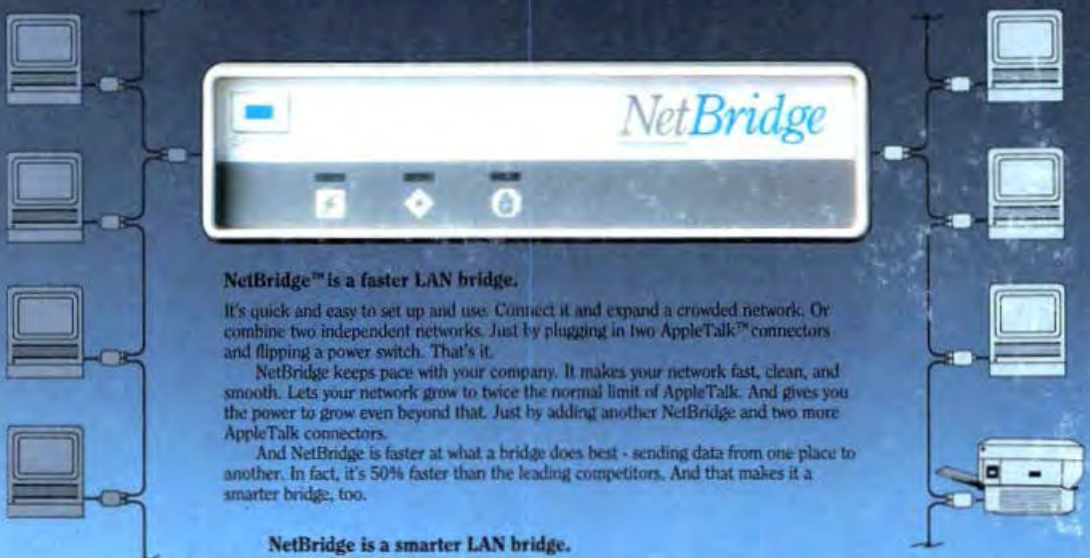
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